Digitized by the Internet Archive
in 2010 with funding from
University of Toronto

http://www.archive.org/details/p3proceedingsmed11roya

P
Med

PROCEEDINGS

OF THE

YAL SOCIETY OF MEDICINE

EDITED BY

J. Y. W. MacALISTER

UNDER THE DIRECTION OF

THE EDITORIAL COMMITTEE

VOLUME THE ELEVENTH

SESSION 1917-18

PART III

SECTIONS:—

DONTOLOGY OPHTHALMOLOGY OTOLOGY PATHOLOGY
PSYCHIATRY THERAPEUTICS AND PHARMACOLOGY
NOTES ON NEW BOOKS

INDEX

153252
12/11/19

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1918

London:
John Bale, Sons and Danielsson, Ltd.,
Oxford House,
83-91, Great Titchfield Street, Oxford Street, W. 1.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY

J. Y. W. MacALISTER

UNDER THE DIRECTION OF

THE EDITORIAL COMMITTEE

VOLUME THE ELEVENTH

SESSION 1917-18

SECTION OF ODONTOLOGY

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1918

Section of Odontology.

OFFICERS FOR THE SESSION 1917-18.

President—

J. H. Badcock.

Vice-Presidents—

(Resident)

J. Lewin Payne.
M. F. Hopson.
J. G. Turner.

(Non-resident)

E. O. Fergus.
Morgan Hughes.
G. O. Whittaker.

Hon. Secretaries—

F. N. Doubleday (*Section*).
J. Howard Mummery (*Foreign*).

Curator—

J. F. Colyer.

Other Members of Council—

(Resident)

Wilton Thew.
H. C. Highton.
S. F. St. J. Steadman.
H. Chapman.
J. E. Spiller.
W. H. Dolamore.
C. S. Morris.
G. Paton Pollitt.
E. Sturridge.

(Non-resident)

G. Sheppard.
C. S. Prideaux.
Vernon Knowles.
L. F. Morris.
A. de Mierre.
Christopher Badcock.
H. P. Pickerill.
A. E. Rowlett.

Representative on Library Committee—

J. Lewin Payne.

Representative on Editorial Committee—

F. N. Doubleday.

SECTION OF ODONTOLOGY.

CONTENTS.

October 22, 1917.

PAGE

J. H. Badcock.

President's Address 1

G. Northcroft.

A Short Account of a Year's Work at one of the Jaw Injuries Centres of the London Command 6

March 11, 1918.

C. H. Bubb, L.D.S.Eng.

Some Principles involved in the Treatment of Mandibular Fractures ... 27

Percival P. Cole, F.R.C.S.Eng.

The Operative Treatment of Ununited Fractures of the Mandible ... 38

April 8, 1918.

J. Howard Mummery, D.Sc.(Hon.), M.R.C.S.

On the Tubular Enamel of Marsupials 49

December 10, 1917.

W. H. Dolamore.

The Bruhn-Lindemann Needle Extension for fixing Edentulous Portions of a Fractured Mandible 66

V. H. Kazanjian.

Splints combined with Sutures through the Bone for the Immobilization of Extensive Fractures of the Lower Jaw 67

April 8, 1918.

H. P. Pickerill, M.D. PAGE

(1) Arthroplasty of Temporo-mandibular Joint for Ankylosis 87

(2) The "Screw-lever" Splint 90

June 10, 1918.

F. J. Bennett, M.R.C.S., L.D.S.

The After-death Destruction of Teeth and Bones by Mould Fungus ... 93

Sir StClair Thomson, M.D.

Tooth impacted in a Secondary Bronchus of the Left Lung: Removal by Tracheotomy and Lower Bronchoscopy after Two Unsuccessful Attempts by Upper Bronchoscopy 100

Ernest Sturridge, L.D.S.Edg., D.D.S.N.Y.

Case of Rheumatoid Arthritis treated by Ionization of Periodontal Membrane 112

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

John Bale, Sons & Danielsson, Ltd., 83-91, Great Titchfield Street, London, W. 1.

Section of Odontology.

President—Mr. J. H. Badcock.

(*October* 22, 1917.)

PRESIDENT'S ADDRESS.

By J. H. Badcock.

The war work of the dental profession has fallen broadly into two categories, one that may be called pure dentistry and the other, the treatment, in conjunction with the surgeon, of injuries of the jaws and face.

Of dentistry proper an enormous amount has been done up and down the country, at home and abroad, officially and unofficially, paid and unpaid, not forgetting that most charitable work, the clinic established for our wounded prisoners interned in Switzerland; but it is rather of jaw injuries that I wish to speak to-night.

The very mass of clinical material garnered by the cruel hand of war has afforded an unequalled opportunity for the study and advancement of medical science, and facilities for research and for practice have arisen such as would never have been available in peace time. It is for us to see that those opportunities are used to the utmost benefit of the wounded. To this end two things are essential. First, the provision of suitable and adequate accommodation and equipment for the study and treatment of jaw injuries wherever they may be found, at home or abroad, and second, the publication of full and accurate records of the results of such study and treatment.

All subjects of jaw injuries should be treated at special hospitals or in special departments of general hospitals, a fact realized very early in the war by the French and Germans alike, but which gained but tardy recognition in England. In spite of the efforts of the dental profession, officially and unofficially, to press upon the War Office the need of providing special treatment for this class of wounded, it was not until July, 1915, practically a year after the outbreak of war, that jaw cases began to be concentrated at the Croydon War Hospital, whence, later on, they were transferred to its Stanford Road section which was, in effect, the first special jaw hospital in Great Britain. Since then much has been done, but much yet remains to be done. Indeed, now in the fourth year of the war, there are still large general hospitals, receiving numbers of jaw cases, unprovided with jaw departments, such cases being left to the care of dental surgeons who give up their time to treat them gratuitously, with the most inadequate accommodation, making all necessary apparatus in their own laboratories at their own expense—a haphazard way of treating the wounded soldier, to say nothing of the unfairness to the dental surgeon, deserving of the strongest condemnation. Moreover, there is still a steady stream of jaw cases flowing to hospitals where there is no special provision for them of any sort, whence some, most of them I trust, eventually find their way to special hospitals. One can understand that it is inevitable that a few should filter through by accident, but that any patient suffering from a fractured jaw should nowadays be sent knowingly where there are no facilities for special treatment is little short of a scandal.

For the jaw case without other serious injury a special hospital affords the best treatment. He is, at any rate after the first week or two, usually an able-bodied man needing active exercise and employment. Under the régime of a general hospital, devised as it is to suit people who are ill, he becomes bored, restive and troublesome, a nuisance to himself and to everyone else. In cases of severe injury a man may be under treatment for a period running into years and there is grave danger that the idleness which he at first finds irksome, and later tolerable, may become at last a habit from which he may never shake himself free. For him the ideal is such an institution as the Queen's Hospital recently established at Frognal in Kent, away from the temptations and disadvantages of a town, with opportunities for recreation and useful work, in workshop, farm, or garden. Under such conditions one may reasonably hope for the most rapid cure, the greatest benefit with the minimum of harm; indeed, at such a place there is no reason why he should not go far towards learning a trade by which he might gain his livelihood on discharge. If on the other hand the patient is suffering from other serious wound or wounds, the facilities of a general hospital are a necessity. But while his other wounds are being treated he must not be deprived of that help for his jaw which only a dental surgeon can give. Therefore every general hospital receiving jaw cases must have attached to it a special department properly equipped for this work. Every such special hospital or department must be staffed by dental surgeons, qualified by training or experience for the work they have to do, in conjunction with surgeons who, in their turn, should when possible, be selected for their special knowledge of the particular branches of their art most needed in the treatment of jaw injuries, such as plastic surgery and bone grafting. It must also include a laboratory for the construction of splints, manned by dental mechanics in the ratio of not less than one to every thirty patients. It is only by the closest collaboration between surgeon and dentist that jaw injuries can be treated with the best, or even with passable results.

Next in importance to staff, accommodation, and equipment, if we are to do the best for our patients and if our work is to be of more than temporary value, are the recording and publishing of results. Complete records should be kept of each case. Such records should comprise:—

(*a*) Photographs taken on admission and discharge. These may be supplemented in special cases by coloured photographs, drawings in colour, and plaster masks.

(*b*) Skiagrams, taken on admission and afterwards as needed, and the skiagrams should be good. If they be not first rate, important detail may be overlooked and the patient's recovery be delayed, thereby involving much waste of time, the loss of the man's services to the nation, and considerable expense for his maintenance.

(*c*) Models, the first being taken as early as possible and the last on discharge.

(*d*) Charts, the more uniform the better, showing site, nature, and extent of injury.

(*e*) Accurate notes of the previous history, condition on admission, and progress, including full details of any operation and of all appliances used. Should such appliances depart from a standard type they should be sketched or photographed.

The functional power of the jaws at the time of the patient's discharge should be accurately noted. Too often the final record of a case is merely a photograph of the patient duly furnished with artificial dentures, and the reader is left in the dark as to whether he is able to eat with them or not.

The foregoing data would together form the history of each patient. Such histories in the mass would be of the utmost use to any worker desirous of checking his results and drawing conclusions therefrom, and would form a mine of wealth for the independent investigator. What might we not learn from them—e.g., as to what cases were suitable and what unsuitable for grafting, how soon a graft might be successfully undertaken, the best material for the graft, the best way of fixing it, whether or not to immobilize the jaw, and as to numbers of the details which experience alone can teach? Or of the treatment of wounds and scars, the relative value of various antiseptics, of sunlight, violet rays, high frequency currents, ionization, massage, and cupping? At present all these methods are in use, but we fail to benefit from them as we might because the results are not collated and made accessible.

In the better equipped hospitals the machinery for carrying out such a system already exists, in others it does not, and I would ask anyone who has to do with the organization of a hospital or department for the treatment of jaw injuries not to fail to demand it. Such systematized case-taking is worth while, and would save its cost over and over again, in that it tends to better results and quicker results, but it can only be carried out if the practitioner be provided with adequate assistance, directed to economize his own time. In a large department it might be done by a registrar specially detailed for the work.

Next in importance to observation itself, in the advancement of knowledge, is the comparison of observations. Observation is stimulated by comparison. I was much gratified the other day to see in the *British Dental Journal* an invitation from the staff of the Queen's Hospital, Frognal, to all interested in jaw injuries to visit the hospital and join with them in informal discussions illustrated by selected cases. Such a project is altogether admirable. I venture to congratulate the Queen's Hospital on its departure, and to express the hope that others may follow its example.

But more than this is needed. I would urge every worker in the field to make it his business either individually, or in collaboration with colleagues, to record his observations and his experience for the benefit of others. Mr. Colyer has published an account of his work at the Croydon War Hospital, Major Gillies, in Paris, read a paper on his work at the Cambridge Hospital, Aldershot, and to-night Mr. Northcroft is giving us a review of what has been done in the special department of the First London General Hospital, which he was mainly instrumental in establishing. I hope that every Special Hospital and Special Department for the treatment of jaw injuries will consider it part of its duty to publish reports from time to time; half-yearly would not be too often in the case of a subject so new and so rapidly developing as ours.

If some such system of records were generally adopted there should be no difficulty, as there has unfortunately been in the past, in producing even at short notice a contribution to a national or international congress of which we might be justly proud.

In a word, gentlemen, the aim of these discursive remarks is to ask you, who are dealing with jaw injuries, to lose no opportunity of insisting, in season and out of season, on suitable provision being made for their care, and on conditions and equipment for those who treat them that will allow of the utmost development and advancement of our knowledge and methods, both for the sake of our soldiers to-day, and the benefit of posterity; to ask you too, if I may do so without impertinence, to record and publish your work so that British facial surgery may attain that pre-eminence in the eyes of the nations, which we steadfastly believe the British Empire and its Allies will achieve in the field of arms.

(*October* 22, 1917.)

A Short Account of a Year's Work at one of the Jaw Injuries Centres of the London Command.[1]

By G. Northcroft.

This paper is a review of the work done at one centre with a staff working a certain number of hours, and is intended as a guide for future emergencies. Although the proportion of jaw injuries may be small compared with the number of other injuries received, it has been proved undoubtedly, both here and abroad, that their total number makes the provision of jaw centres in every Command an essential part of an efficiently organized medical system, and is a point that must never again be neglected. A Jaw Injuries Department of a General Hospital seems the best arrangement for the efficient treatment of such wounded. Experience proves that a large number of men suffer from multiple wounds, and have to be closely watched alike by physicians, surgeons, and dental surgeons. Even in special hospitals it has been frequently shown that the hearty co-operation of all three is essential, and, by following the ideal method, unnecessary multiplication of staffs, with the attendant expense, is largely avoided.

It must not be forgotten, however, that the presence of jaw cases in a General Hospital very seriously handicaps those C.O.'s who are anxious to create records for rapidity of cures and the handling of a maximum number of patients. Supposing that the average detention of a man in hospital is three or four weeks, even the simplest fractured jaw tends to double this average. It is suggested, therefore, that to avoid the opposition that has sometimes arisen to the reception of jaw injuries, owing to the tediousness of the treatment and the extra strain on the staff, all jaw statistics should be kept separately, so that the otherwise good record of a hospital should not be interfered with.

The appointment of a Dental Officer to such Medical Boards as sit on jaw cases commends itself as a common-sense arrangement, that would simplify the onerous work of the boards, and also the problem of the classification of the wounded. It has been stated that only medically qualified dental surgeons are fitted to undertake the treatment of these cases, but the fact that many of our confrères are doing good work by using their medical skill, and are not being employed in their speciality, shows that, at any rate while the shortage of medical men continues, those dental surgeons without medical qualifications who have the necessary skill are being wisely employed by the authorities where it is known that complementary medical and surgical co-operation is available. The operations necessary in the treatment of jaw injuries are of a complicated nature, but while splints for other fractures can be supplied ready made, our work demands a specially made apparatus for each individual, however much an operator may confine himself to one method of treatment.

---

[1] Owing to the cost of production, all illustrations of splints and several photographs shown in the epidiascope have been omitted.

The point I wish to make is that the dental laboratory and expert mechanical aid is an additional but an essential part of a Jaw Injuries Department. It is hardly realized, outside our own profession, how faithful and exact must be the work of the laboratory, if endless delays, and the extra suffering entailed, are to be avoided, and therefore, how necessary it is to have good mechanics and plenty of them. Four to every hundred patients is really the minimum that ought to be entertained.

The extreme importance of very highly skilled radiographers for this work cannot be too strongly emphasized. Many unreadable plates are produced, and an enormous amount of time and money wasted thereby; for instance, the production of thin negatives or lateral views taken with the sides of the mandible superimposed, ought seldom, if ever, to occur. But it is none the less true that no attempt at treatment should be made without the use of this great aid, and stereoscopic plates seem preferable to any others. Photographic records where any plastic work is involved are well worth the time and trouble, and should be made a routine for all Jaw Injury Departments. It is astonishing how quickly one forgets the original appearance of a wound after continuously seeing a patient for two or three months progressively improving. Plaster casts have also proved their value in showing the exact contours and assisting the surgeons in carefully planning the amount of tissue necessary to restore lost features as fully as possible.

The cases received at the First London General Hospital Jaw Injuries Department since it was inaugurated at the end of July, 1916, to September 7, 1917, have amounted to 248, apart from cases seen in consultation on account of dental disease, or others that have been immediately transferred without treatment. The Department was started with two dental surgeons working every day for the first month and with no laboratory, the necessary splint work being produced by one unattached mechanic, and it is a great pleasure to record that the patriotic labour of this one man, working early and late, without hope of fee or reward, did much towards solving many difficulties created by the delay in building our laboratory, which was not completed until January 1, 1917. About that time it became evident that assistance must be obtained for the purely dental work, which is so essential an accompaniment of efficient treatment, and an Army Dental Lieutenant was appointed to attend three half-days a week. An assistant mechanic was next added, and in July, 1917, owing to a great increase in the number of patients, our President was appointed the third consultant. In future it should be laid down as a stringent rule when creating a Department that adequate provision should be made at the start for a contemplated maximum number of patients according to the general arrangements made at any particular hospital. This maximum number should seldom, if ever, be exceeded.

Our statistics cannot, of course, be compared with the number of cases seen at some other centres, but are large enough to demonstrate certain conclusions. Lindemann reports from Düsseldorf that the cases there showed the ratio of fractured mandible to maxilla and mandible and maxilla to be 5 : 1 : 1. Our ratio is seen to be practically the same for the mandible to maxilla, but the ratio of mandible to mandible and maxilla is 8½ : 1. This difference is possibly due to the smaller number of cases examined. Of 248 men seen on September 7, 1917,[1] 20 have been transferred, and 2 have died a few days after admission, with 116 still under treatment; 136 sustained fractures of the mandible only, twenty-five of the maxilla only, and sixteen of both mandible and maxilla. Thirty-four have been treated for fractured teeth and alveolar process. Seven suffered from closure only, probably due to cicatricial contraction following an injury not treated at this centre. Nine nasal cases have been treated in co-operation with a rhinologist. One remarkable dislocation will receive detailed attention later.

[1] Since that date fifty-eight new cases have been seen and forty-five cases have been discharged, making a total of 306, and the number still under treatment 129.

Of the 110 men discharged failure to procure bony union has only occurred in twelve cases (almost exactly 10 per cent.), in one of which was a maxilla completely torn from its bed by a piece of shell which was subsequently removed from the right antrum, and measured 1½ in. long by ½ in. sq. When this patient was discharged he could chew satisfactorily but his teeth still felt "velvety" on mastication. Seeing this man had a remarkably good set of teeth for an English soldier it was decided not to render him edentulous in an endeavour to produce a result which after all was problematical. It is curious to note that of these partial failures seven occurred on the left side and involved the angle and part of the ascending ramus, leaving the posterior fragment edentulous, being combined in some cases with paralysis of the injured side, so that mastication on that side was rendered impossible and the insertion of a bone graft of very doubtful utility. One case had lost the anterior third of the tongue, which rendered the management of any bolus of food impossible. Of this series, the most disappointing was a case that showed apparent union according to the X-ray report and broke down on attempting full diet. The jaws were again immobilized, but the patient being transferred at his own request for family reasons, the case was lost sight of. Five of these cases were supplied with modified Villain's *bielles*, which were working admirably at the time of discharge, giving the patients as full use of the jaws as could reasonably be expected, the ideal aimed at being the management of full diet.

The case of chronic dislocation, being somewhat unique, deserves description. A private, of indifferent physique, was sent to this centre on account of repeated bilateral dislocation which became more and more frequent, commencing first in January, 1915. He was first seen in the department on September 1, 1916, and it was said that his jaw had been displaced a very large number of times. As will be readily seen from the models, the lack of dental inspection by an experienced dentist, and a too rigid economy, kept this man as a positive expense to the State for two years, and a source of irritation to the medical staff. He had been supplied with a denture for the maxilla only and the third molars were the only teeth left for natural occlusion. The maxillary molars occluded buccally to the mandibular, so that every time the mastication of food was attempted, the temporo-mandibular ligaments were stretched to such an extent that finally the mandible fell out of its normal position on the slightest provocation. On September 4 the jaws were immobilized to give the stretched ligaments rest. Grave difficulty

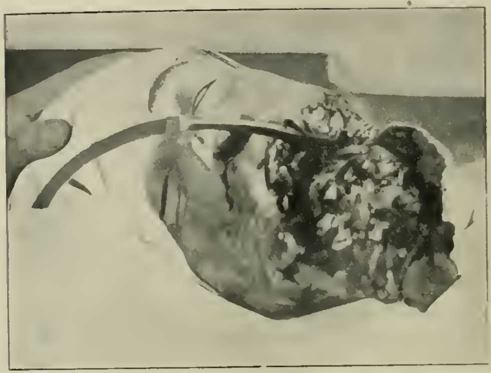


FIG. 1.

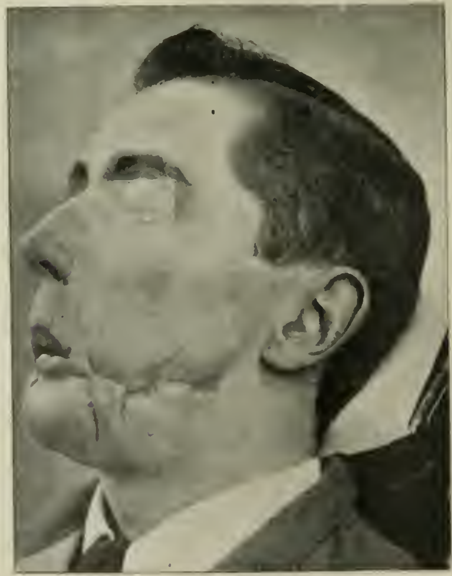


FIG. 1A.

was experienced with the patient, who seemed very restless under this treatment and was seriously thought at one time to be malingering. Fixation by ligatures proved a failure, but the principle was maintained by using upper and lower cap splints on the front teeth. These were being perpetually wrenched off and the jaws again dislocated as late as October 7. On October 10 septic roots were removed from the mandible and new splints constructed covering the whole of the remaining upper and lower teeth. The jaws were then satisfactorily immobilized for four weeks. A lower vulcanite splint was next constructed to aid in mastication and to prevent the too free movement of the jaws until such time had elapsed that dentures could be made. Upper and lower dentures were inserted in March, 1917, no further dislocation having been reported. This case shows how economical and essential it is to have a properly organized system of dental inspection, and illustrates the fact that dentures cannot be turned out like, one might say, boots from a factory.

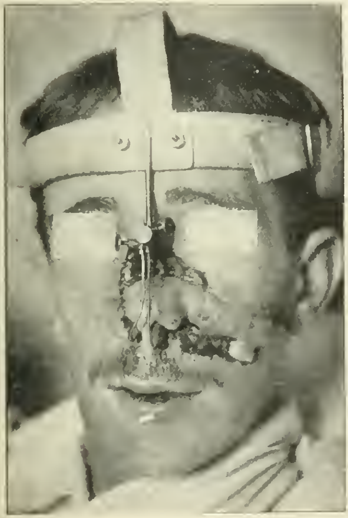


FIG. 2.

The cases of fractured teeth and alveolus need no comment except that one has remarked in some of the cases how singularly slow the sockets are to heal, this seeming to show the existence of deep-seated sepsis, or the failure of quick reaction due to excessive trauma or temporary lack of function of the jaws.

Owing to the pleasant co-operation which exists between the dental and surgical staffs it has been our privilege to assist in several nasal cases by constructing the necessary splints and appliances. The cases have not presented any unusual features; the use of vulcanite tapered tubes has been almost exclusively adopted as nose olives which, having been inserted, were at first attached by their anterior ends to rings of aluminium covered with webbing buckled round the head (fig. 2). Later it was found quite sufficient to hold the olives in by strapping, slipped under a wire loop attached to the anterior end of the vulcanite. One modification may be shown by which the columella was saved after it had become detached and was being bandaged down to the upper lip by the dressing. Olives were first inserted and a support arranged between them. When cicatrization had progressed sufficiently

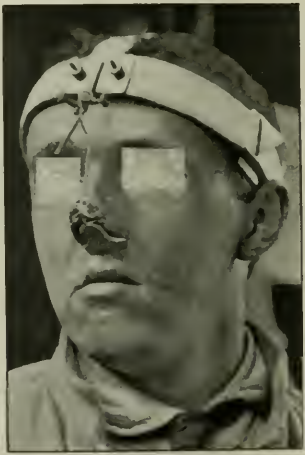


Fig. 3.

to ensure the nostrils remaining patent, this arrangement was changed for a vulcanite pad attached to an aluminium crown which was used with great success (fig. 3).

Those cases of closure that have not been prevented by using interdental extension pieces on the splints in the first place, have been treated by slowly and continuously pressing the jaws open, rather than by forcibly wrenching them, less chance of recurrence being involved. Seven cases have been treated for this condition only, and in support of the principle laid down, it has been the custom to construct metal caps for the upper and lower teeth and insert a Talbot coil of heavy piano wire in vertical tubes or vertical upper and horizontal lower tubes with stopped ends. The springs should be carefully adjusted to articulated models and care taken that the tubes are equidistant on both sides. This treatment should be supplemented in obstinate cases by the use of screw mouth-openers for ten minutes twice a day.

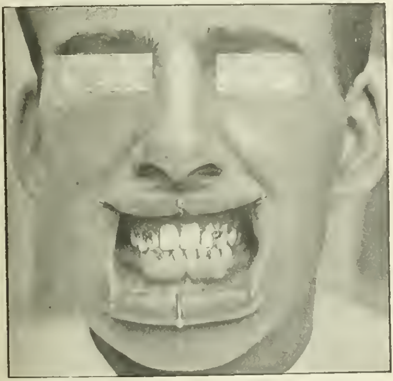


FIG. 4.

In the treatment of fractures it has been our ideal to use whatever method seemed best suited for the case in hand, to free our mind of prejudice, and be catholic in our tastes (figs. 4, 5 and 6).

The first great principle governing the treatment of jaw injuries of whatever type is oral hygiene. To attain this all septic teeth, roots, and other foci of infection should be removed as early as possible.

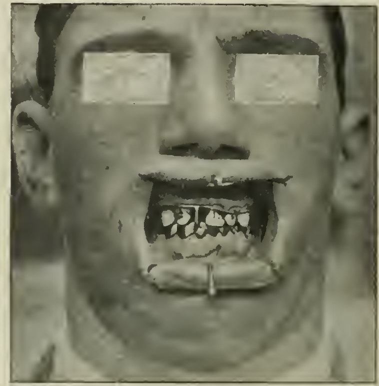


FIG. 5.

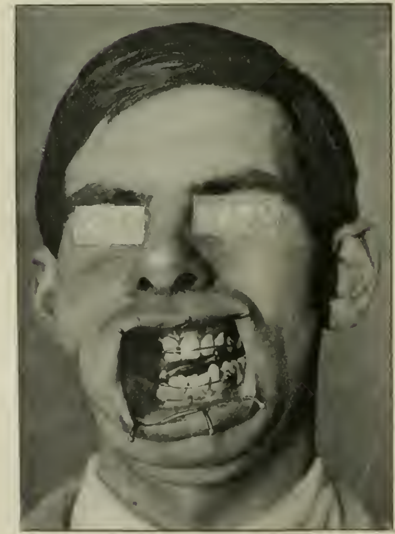


FIG. 6.

This may sometimes prove a very difficult ideal to attain. For example the removal of a root from a fragment itself so loose that one feels the part is a greater problem than the whole. There are exceptions to every rule, but time and again one has proved the efficiency of this treatment in the earlier response of the tissues to repair. One also recognizes that in extreme cases, when roots or crowns of teeth have been blown into the tongue or cheek, or a foreign body may be undetected in the soft parts, time only will reveal these sources of infection, but the preliminary surgical toilet of the mouth will only be slightly impaired by such an oversight and the general principle holds good. This preliminary treatment should be followed up by constant irrigation.

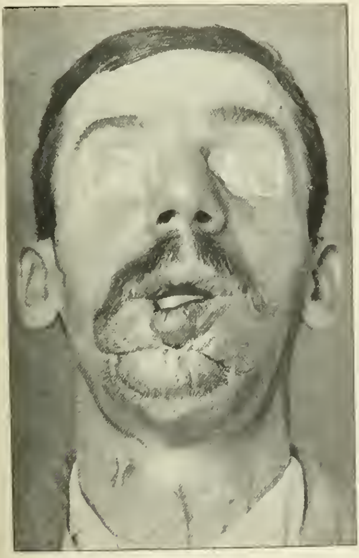


Fig. 7.

It seems unwise to lay down any hard and fast rules as to extractions near the site of fracture. One must necessarily be guided by circumstances. Even a septic tooth may have to be retained to form a *point d'appui* to rotate, evert, or invert a fragment which otherwise would have to be left to take its abnormal, possibly unfavourable position of convenience. Remove such teeth at the earliest opportunity by all means, but do not ruin a result by too early radical treatment. The second step to all possible cleanliness is a correct assembly of all misplaced fragments, and experience again teaches that the nearer the fragments can be placed to normal contact, the quicker good results are obtained. It is a curious thing about jaw work that, whenever one tries to lay down a fundamental principle, it always seems to be upset by the next half-dozen cases one sees. A Canadian, a returned prisoner of war, was seen who had been successfully treated for a fracture of the mandible at the angle, still retaining a septic root which had actually given rise to an abscess and had not been removed. With indifferent dentures such as one so frequently sees in an English soldier, where grave comminution is present, accompanied by profuse suppuration and possible loss of substance, contact, even at the loss of ideal occlusion, produces quicker and more satisfactory results than ideal occlusion and the doubtful utility of bone-grafts. One has yet to see the successful

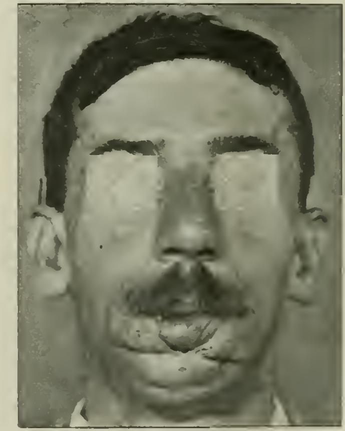


Fig. 7a.

bone-graft where an ideal occlusion has been obtained. We feel, therefore, that it is largely a matter of degree of asymmetry or malocclusion, and the personal equation comes very largely into play. Touching the subject of comminution, I heartily endorse all that has ever been said since the first days of the war as to the danger of surgeons being too drastic in their treatment. It is a very grave responsibility for a surgeon to remove any pieces of bone that are attached by periosteum, however loose they may appear to be. One is confident that many such pieces form a bridge upon which new bone is built, or centres from which osteogenesis radiates. It is a regrettable fact that satisfactory treatment for the posterior edentulous fragment is still lacking; external transfixion of the ascending ramus has never been attempted with us, and all the cases with much loss of substance suitably treated by bone-graft have been cases of this type. In these cases, even where union is complete, much shortening frequently occurs

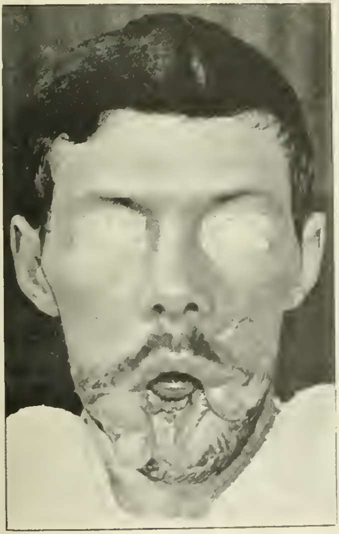


FIG. 8.

from the upward and forward movement of the uncontrolled fragment and renders the management of a bolus of food on the injured side a practical impossibility when artificial teeth are inserted. The ideal union as demonstrated by sawing through a morbid specimen is seldom seen in gunshot wounds; only too often, contact is missed altogether.

Another point that experience has taught is the removal of cheek teeth in order to let the lips approximate when there has been much loss either of bone or soft parts in the region of the symphysis (figs. 7 and 7A). Frequently in restoring the lower lip line the plastic operation involved lowers the lip line so much that this is the only method that can be adopted to bring the lips into contact (figs. 8, 8A, and 9). We would appeal to all plastic surgeons in consequence of this, and many similar operations, to make flaps big enough to avoid, as far as possible, this contraction of the buccal orifice. This result is shown in photographs and casts.

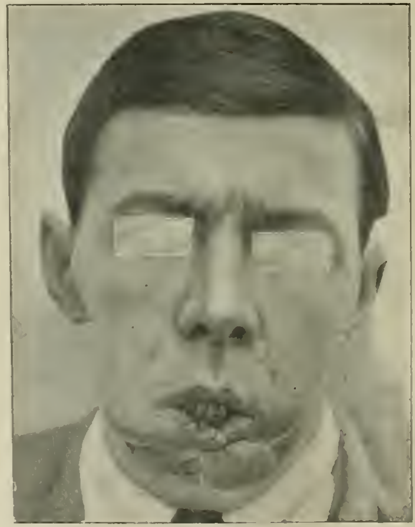


FIG. 8A.

In fractures of the mandible only, cemented cap splints have been largely used, the displaced fragments first having been reduced as nearly as possible to normal. The *attelle* has not been used as much because of its greater tendency to become uncemented. Recourse has been had to immobilization only where the posterior fragment or fragments are edentulous. The method of reduction depends very largely on the condition of the individual patient, the time elapsing between the date of injury and the commencement of the treatment and the mobility of the fragments; and varies from the simple ligature of wire or grass line, the reconstruction of a model to normal and the forcing of the fragments into a splint so constructed, to the more elaborate methods founded on the principles developed in ordinary orthodontic practice. Simplification and cleanliness of apparatus are always the first aim.

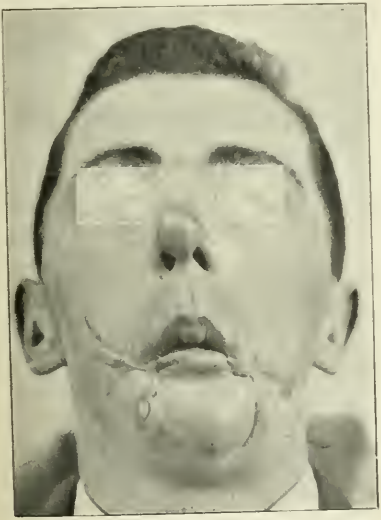


Fig. 9.

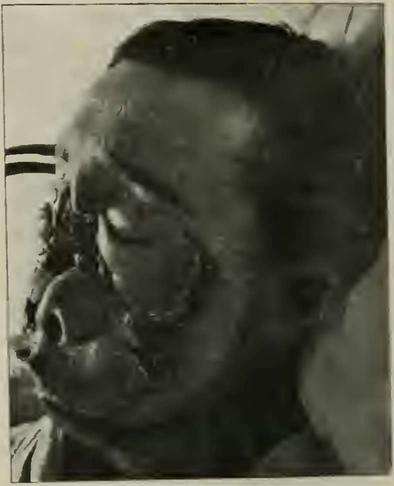


Fig. 10.

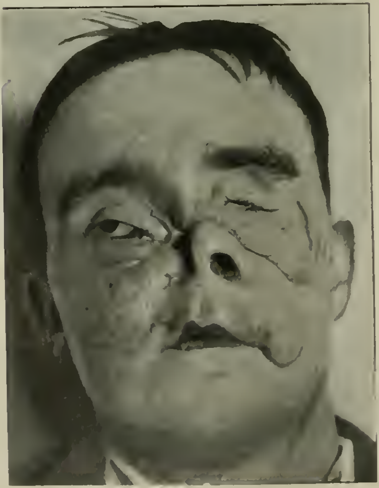


Fig. 10a.

In treatment of fractured maxilla, time is an even more important factor, the reduction of the underlying bone being more difficult, while the soft tissues cicatrize very rapidly, often causing irreducible malformations of the palate (figs. 10, 10A). The antrum is very often involved, and the necessity of an intranasal operation is indicated where chronic suppuration of this sinus persists. The closure of small openings by operation is of doubtful utility, as no cases have yet been seen where a denture was not required, owing to the loss of teeth, before or at the time of injury, and this effectually closes any opening in the hard palate. In cases of greater loss surgical interference is out of the question, and one must resort to the usual restorations as practised for excision of the maxilla for malignant disease. No case of loss of the soft palate has yet occurred at this centre. A graduated series of vulcanite plates seems to fulfil the requirements of most cases, often accompanied by the use of chin and skull caps. Where the whole maxilla has been wrenched off its bony base, the Hamilton bandage

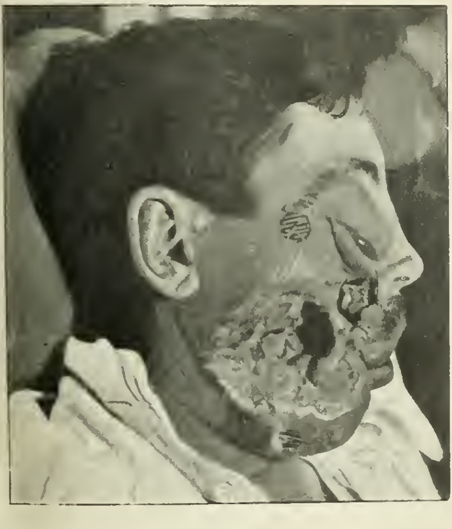


FIG. 11.

and the upper Hayward splint have been used to advantage. This allows mobility of the lower jaw, and the calvarium is used as a *point d'appui.*

In fractures of both mandible and maxilla some form of double Gunning splint must be adopted, being necessarily removable. If there is no displacement in the upper jaw and the teeth only require to be steadied, the splint may consist of upper and lower metal caps soldered together. If there is gross displacement of the palate, or perforation, a vulcanite upper with a metal lower cap can be used with advantage. If the fracture is accompanied by extensive laceration of the soft parts an interdental extension has been found of great service in preventing subsequent closure from cicatricial contraction, and as an aid to feeding where the occlusion is nearly perfect (figs. 11 and 11A). This should be accompanied by some form of chin support, such as the aluminium chin cap and head net, which has been the method most favoured for immobilization at this centre. A broad rubber elastic bandage has also been used, and a Hamilton bandage with chin piece.

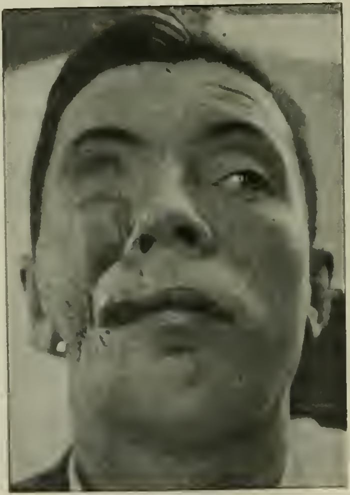


FIG. 11A.

One result has been seen to-night which can be obtained without bone-grafting (fig. 9). This result has come about in just one year. Another case has been shown of a patient wounded in August, 1914, who was operated on by Lindemann and Bruhn at Düsseldorf in March, 1915, and supplied with a tibial graft under local anæsthesia, the graft being fixed by ivory pegs. In this case the posterior fragment was endentulous and no external fixation was used. As far as one can gather union was not satisfactory at the medial end, for the patient having been interned in Switzerland on December 14, 1916, was operated on in February, 1917, for the excision of bone and hair from the anterior end of the graft. In May, 1917, Professor Matti inserted a graft from the crest of the ilium, the skiagram of which can be seen (figs. 12 and 13). Four dentures have been constructed unsuccessfully

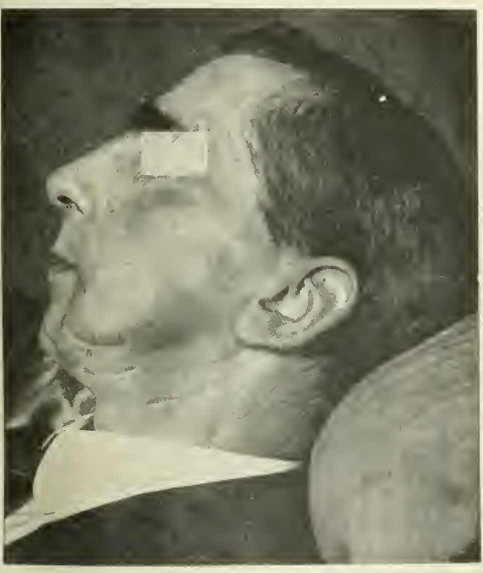


Fig. 12

already, and the man at present has only two right lower molars to chew with. Presumably, the failures were brought about by failing to recognize that the left cheek was paralysed, and that a bolus of food could not be dealt with on that side. It is hoped that the new dentures will prove of greater service.

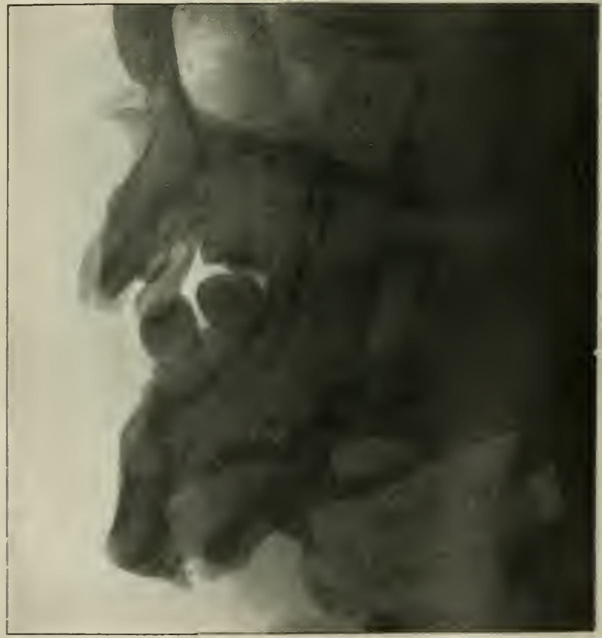


Fig. 13.

DISCUSSION.

Major W. McAdam Eccles: I would emphasize two points. It is preferable that a "Jaw Department" should be attached to a general military hospital, for then co-operation can be most fully obtained. It is highly advantageous to the patient for the surgeon not to be in a hurry, not to perform plastic operations too early, and not to hurry over their performance when the proper time has arrived for operation. Some of the results brought about largely by Nature herself are truly wonderful, and she can be helped towards the end frequently a great deal better than at the beginning.

Mr. William Hern: Mr. Northcroft is right in laying down as a first consideration in the treatment of fractured jaws the removal of septic foci, such as retained and decaying roots, but he has not referred to the importance of keeping the gums healthy by frequent and regular friction with the tooth-brush. The enforced absence, or limitation, of movement of the jaws in these cases, combined with the soft diet necessitated, abolish all natural friction, so that the gums soon become soft, spongy, and infective. The prevention of these conditions is a very important part of the treatment, and of real value for speedy healing. In regard to the treatment of fractures of the mandible in which the posterior fragment is destitute of teeth, to which Mr. Northcroft has referred, the best plan is to wire the fragments together by an operation which does not involve a communication with the mouth. Cases treated at No. 3 General Hospital, Wandsworth, in this manner by my surgical colleagues under my advice have resulted in good bony union.

Mr. A. H. Parrott: There is a variety of splint which I have found effective in many cases of mandibular fracture, single or multiple. Cap splints are fitted to the lower fragments and upper teeth. To these are soldered hooks for traction, if needed, with rubber bands, or wire; when brought to correct occlusion the splints are locked together by a straight wire on either side inserted into tubes previously soldered to both upper and lower splints in corrected position, and divided into sections (like an ordinary hinge) at points most convenient. Hooks are advisable in case of excessive strain on the tubes. The method often obviates unnecessary removal of splints for alteration.

Mr. Doubleday: Does Mr. Northcroft put up his fractures in an open or in a closed bite position; and is he content with a small splint over a few teeth, or does he use a larger one? Does he make any use of the newer lotions such as eusol, or is he content to have his cases treated by older methods, such, for example, as normal saline followed by peroxide of hydrogen?

Mr. G. NORTHCROFT (in reply): Mr. Hern referred to a point certainly omitted from the paper, but the importance of healthy gums is constantly impressed on patients when instructing them in the care of their own mouths. Mr. Parrott's tube and pin method is good, but wire ligatures attached to upper and lower hooks when *opposite* often seem as satisfactory. The use of open or closed bite depends on the case, the latter for choice. When cap splints are used large ones are found more generally useful where the back teeth can be correctly modelled. A variety of fluids have been used for irrigation, and when extreme fœtor is present some deodorant is indicated, but the general practice is to syringe with warm normal saline, very frequent irrigation being the essential point.

Section of Odontology.

President—Mr. J. H. BADCOCK.

Some Principles involved in the Treatment of Mandibular Fractures.[1]

By C. H. BUBB, L.D.S.Eng.

WITH the exception of a few remarks on radiography, it is not my intention to deal with the routine treatment of fractures of the mandible, but rather to discuss certain principles, which have guided my method of procedure at King George's Hospital and elsewhere, in association with Mr. Cole, and particularly to deal with certain controversial questions.

The initial treatment of frequent irrigation varies only in the type of antiseptic employed. We have invariably found lotio sodæ chlorinatæ yields uniformly good results. Chloramine, flavine, and other antiseptics have been tried, but with no obvious advantage.

Skiagrams of the site of fracture are taken as soon as the patient's condition permits, generally the day following admission. Their interpretation is not always easy, especially of fractures in the region of the angle and ascending ramus. Owing to the restriction of movement caused by extensive wounds, it is in many cases difficult to obtain an X-ray picture in which these parts are not obscured, either by the shadow of the opposite ramus or cervical vertebræ. Though the X-ray is a great help in the diagnosis of the type of fracture, the condition of the bony ends, the presence of comminution, a root, tooth, or foreign body, it is not without fallacies, more particularly in those later cases of non-union, as a guide to the actual bony loss. It has frequently been observed on exposure of the fragments on the operating table, that the actual gap has exceeded by ½ in. to 1 in. that apparently depicted on the X-ray plate. In one case which had been passed as favourable for bone-grafting, as the result of both digital and radiographic examination, actual exposure of the fragments revealed one-half of the gap to be filled with a semi-cartilaginous osteo-fibrous tissue — tissue whose opacity to the X-rays obscured the definition of the neighbouring fragments. As the result of such extensive loss the operation for bone-grafting had to be abandoned.

---

[1] At a meeting of the Section held March 11, 1918.

The intra-buccal film method, where applicable, yields more accurate information, not only as regards the extent of the gap, but also respecting the depth of the fragments.

The next stage in the treatment, often called the cleaning-up operation, can best be discussed under two headings :—

(1) Extraction of teeth.
(2) Procedure at site of fracture.

(1) Our consistent policy has been one of ultra-conservatism. We never sacrifice loose teeth, teeth partially denuded of periosteum, or any roots which may be utilized for purposes of anchorage. Teeth or roots actually in the line of fracture have been removed, but we have not found it necessary to adopt the routine methods advocated of extracting teeth on either side of the fracture, nor to sacrifice all teeth the roots of which are involved in an extensive comminuted fracture. The desirability of clearing the mouth of any roots at this stage is generally contra-indicated owing to the debilitated condition of the patient, and the practical impossibility of doing so without disturbing the site of fracture. The early removal of such roots or teeth, especially when situated adjacent to a fracture, is, owing to rapid absorption of the alveolus, a frequent cause, too, of the neighbouring and lacerated soft tissues becoming adherent to a more extensive area of bone, and thus rendering it more difficult for the subsequent adaptation of a denture. Owing to the fact that such patients have their mouths frequently irrigated, it has not been found that the deferring of any necessary extractions at this stage has rendered them more liable to pneumonia, gastritis or enteritis. This is diametrically opposed to the specific claims made by Mr. J. F. Colyer in the *British Medical Journal*, July 7, 1917 :—

"The most striking evidence in support of the removal of sepsis is the almost complete absence of complications such as bronchial pneumonia or intestinal affections."

(2) We never remove any splinters or comminuted fragments of bone unless entirely detached from surrounding tissues. In the early stages this physical condition must be regarded as the only reliable guide, as no X-ray evidence is of the slightest value in demonstrating viability. Greenough, in "The Treatment of Septic Gunshot Fracture" (*Transactions of the American Surgical Association*, xxxiv, p. 87), states:—

"It became more and more obvious to us, as our experience increased, that the surgeon was likely to err on the side of a too radical removal of supposed devitalized fragments in a preliminary operation, rather than when he left to Nature the determination of which fragments were viable and which were not."

This dictum refers not particularly to jaw fractures, but to septic war fractures as a whole.

Major Hey Groves, writing on the treatment of war fractures, expresses a similar opinion:—

"Any direct operative attack upon a comminuted fracture will involve the risk of interfering with the vitality of the fragments, and therefore lessening their ability to act as centres of repair."

We have always adopted the treatment of interfering with the site of fracture as little as possible: early reduction in correct alignment and early splinting to keep the fragments and comminuted pieces of bone at rest has proved to be the soundest and most certain method of controlling and combating sepsis; moreover, this is the basic principle in the treatment of all other gunshot injuries of the body, whether in soft or bony tissues, and is advocated by most leading authorities. Thus Colonel Sir Robert Jones, writing in the *British Medical Journal*, January 12, 1918, on "Gunshot Injuries of Femur," states:—

"Two fundamental principles must be sacredly adhered to:—

"(1) Efficient fixation in correct alignment at the earliest possible moment.

"(2) Continuity of treatment."

Again, in the *British Journal of Surgery*, January, 1918, Morgan, Saner and Schlesinger write as follows:—

"Very valuable work has been done by Major Sinclair and others in insisting on the need for effective immobilization in the treatment of infected wounds, and too much stress cannot be laid on the importance of this side of the matter."

Referring to fractures of the limbs, the same authorities state:—

> "Immobilization has already been discussed; in addition, as perfect as possible a position of fragments must be obtained and obtained early; there can be no doubt the better the alignment of the limbs, by which is meant the position, not only of the bony fragments, but of muscles, nerves, vessels, and lymphatics as well, the more rapid will be the diminution of pain and sepsis."

If further evidence were needed, it would be supplied by the following conclusion of the Committee appointed to render an official report on fractures to the American Surgical Association (xxxiii, p. 775):—

> "Fractures should be reduced immediately after injury. The statistics show markedly better results when the treatment is begun at once."

It is interesting to compare these opinions with those expressed by Mr. Colyer in the *British Dental Journal*, April, 1917, in a paper entitled "Methods of Treatment and Results in Fractures of the Mandible." They are stated as follows:—

> "Gunshot injuries of the jaws are often accompanied by severe laceration and suppuration of the soft tissues, and it is not advisable to adapt splints or other apparatus until the sepsis is well under control.
>
> "Union cannot commence until suppuration has ceased in the region of the fractured bone, and the adaptation of splints at too early a stage, by increasing the difficulty of irrigating the parts, hinders any efforts made to reduce sepsis."

And yet again we have another statement made by the same authority in July, 1917, which runs thus:—

> "To adopt splints in a field of sepsis, as is so often done, is to ignore the most elementary surgical teaching."

As regards alignment in treating fractures of the mandible, it has been our invariable rule to reduce and splint in correct dental occlusion, irrespective of the interval that may be thereby produced between the ends of the fragments. It is essential that early splinting be adopted if this procedure is to be successful. The comminuted pieces, attached by their flaps of periosteum, are then kept at rest, and can more efficiently act as centres of new osseous growth.

In favourable circumstances the gap can be completely bridged by bone thrown out by such comminuted fragments, in conjunction with similar out-growth from the ends of the mother bone. Occasionally, gaps up to 2½ cm. are bridged over with new bone, even when no comminuted fragments appear to be present. This occurred in two cases which came under our care; both fractures were situated in the region of the symphysis. The fragments had been allowed to fall together, producing the characteristic V-shaped deformity, and in this malposition partial union had occurred. Surgical intervention was decided upon—the necessity for which will be apparent on examination of the models shown on the screen—the fracture site was exposed, divided, and fragments prised apart until the normal mandibular arch was restored. A splint previously made to a corrected occlusion was then fixed. Bony union resulted in both cases within three months.

In all cases of union with mal-occlusion, seventeen in number, this procedure has been consistently adopted with uniformly satisfactory results, and has saved much time and labour. For the reduction of this type of deformity, I have never yet had to resort to any form of orthodontic appliance, surgical treatment achieving in half an hour results that orthodontic treatment would take weeks—in some cases months—to accomplish.

In always striving to maintain the ideal arch, the question that will naturally be asked is: "What are your percentages of non-unions?" So far, few published statistics are available for comparison. The only figures of which I am cognizant are those published by Mr. Northcroft (in his report of a "Year's Work at one of the Jaw Injury Centres of the London Command"). Out of 110 cases treated by him, non-union occurred in twelve—viz., 10 per cent.[1] Out of 270 cases that have come under our care soon after the infliction of their injury, non-union has occurred in thirty cases. These figures include cases in which union could not *possibly* be expected. This gives an inclusive non-union of 11 per cent. Excluding twelve such hopeless cases, our non-union works out at 7 per cent. The hopeless cases refer to those in which the major portion of the horizontal ramus had been shot away.

As regards splinting, there are only two types which I propose to discuss, but I believe both are rather different from those in general use.

The first will not detain your attention long, as it is more the method of fixation, rather than the actual splint, which is likely to be

[1] *Proceedings*, 1917, xi, p. 9.

of interest. I refer to the fixation of splints by the aid of circumferential wires, as suggested by Mr. Cole. This method has proved eminently satisfactory, especially in edentulous cases, in which the anterior ends of the fragments are so prone to become tilted downwards when other types of splints are used. This particular method of fixation is not used solely for edentulous cases, but has proved equally valuable in securing splints, when surgical measures have been resorted to for the correction of mal-occlusion. In many instances, it allows of interdental splints to be utilized when otherwise a Gunning would be required, the advantages to the patient being obvious. This method has been employed in twenty cases, and in only two has there been any pain or swelling as a result.

The other type of splint is the one I invariably adopt for fractures occurring in the region of the molar teeth and angle, when the posterior fragment is edentulous. It is a modified Gunning, with a flange extending backward to control the posterior fragment. (This flange should be lined, preferably, with soft rubber; Truman's gutta-percha can be utilized for this purpose, but is not quite so satisfactory.) This splint is made detachable, and although this entails some extra time and trouble, it has a double advantage: first, the site of the fracture can, at any time, be examined from within the mouth by the release of two screws; and secondly, there is no splint yet devised to compare with it should union not occur and a subsequent bone-graft be necessary. As to the control of the posterior fragment, some of you may feel sceptical as to the possibility of being able to achieve this. I have never experienced any real difficulty, though I do not claim, in every case, to be able to maintain it in exactly the same anatomical position it held prior to the fracture; but I do claim that it is quite possible to hold it in approximately that position, and that its control is of such supreme importance that no effort should be spared in the endeavour to attain it. Failure to control the posterior fragment, should non-union result, renders any subsequent operation for bone-grafting, plating, or wiring, so infinitely more difficult. In the majority of cases, this fragment, if left to itself, gets drawn high up outside the alveolus of the upper jaw, and the arduousness of the task of exposing and freeing it can only be fully appreciated by an ocular demonstration in the operating theatre. This splint is always fixed in the open-bite position, the advantages of which are as follows:—

(1) All parts of the mouth are rendered accessible for purposes of cleansing and irrigation.

(2) Comfort of the patient, facilities for feeding, greater range of diet possible; cases splinted in this manner are put on semisolids from the start, consisting of minced meat, potatoes, fresh vegetables, milk puddings and suet puddings, &c.

(3) Prevention of trismus in patients liable to this complication, as a result of extensive injuries of the soft tissues, or when a fracture has occurred in the region of the condyle.

(4) The open-bite position is essential, in intratracheal methods of anæsthesia.

(5) The chances of obtaining bony union are greater in this position than in any other.

This is a bold statement to make, and on this account I propose to justify my claim.

In the first place, let us consider what happens if the posterior fragment is left uncontrolled and the anterior fragment only immobilized. Skiagrams of fractures occurring in the molar region and that of the angle will generally reveal them to be of a comminuted nature. By fixation of the anterior fragment, and allowing the posterior to swing forward, these comminuted fragments are gradually prised out, and eventually exfoliated as sequestra. The consequence is that, if union fails to occur, the gap is considerably increased. This has been amply verified by cases admitted, which had been previously treated by splinting in the closed-bite position, leaving uncontrolled posterior fragments, and by comparing them with the cases treated in open-bite position and a controlling flange. In the latter, any non-unions that have occurred have been dealt with by a comparatively simple procedure of wiring, and with invariable success; but in the former, the more complicated operation of bone-grafting has had to be resorted to.

The control of the posterior fragment allows the comminuted pieces of bone, with their attached periosteum, to be kept at rest, and as a result, their viability is maintained and effective union with the mother bone determined. Sometimes this union is only accomplished with the anterior fragment, or only with the posterior fragment, but in nearly all cases it occurs with one or the other, and subsequent procedure is thereby simplified.

When there are no comminuted pieces of bone, but a clean gap between the fragments—a condition clinically rarely ever seen—splinting in open-bite position with partial control of posterior fragment will present certainly quite as favourable, if not a more favourable, condition for bony union, than in the closed-bite, and allowing the posterior

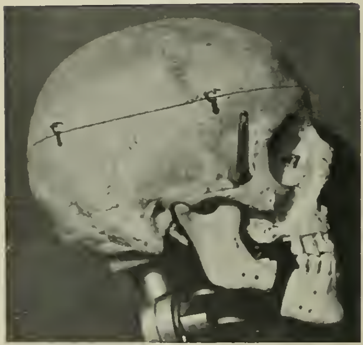


FIG. 1.

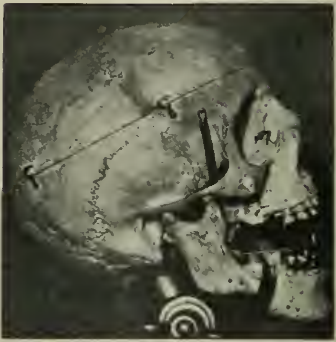


FIG. 2.

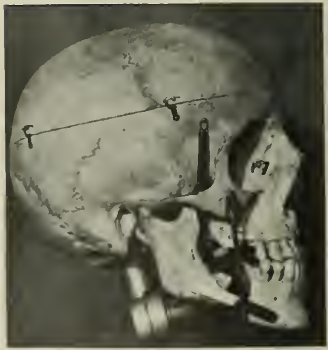


FIG. 3.

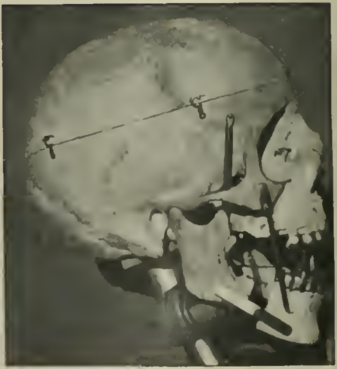


FIG. 4.

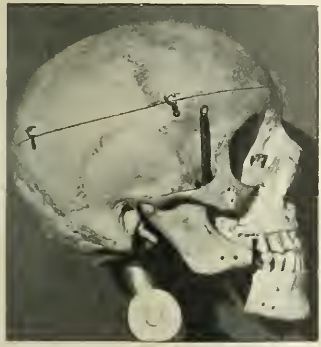


Fig. 5.

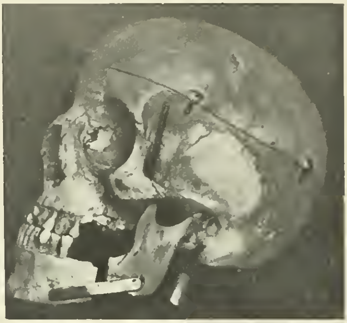


Fig. 6.

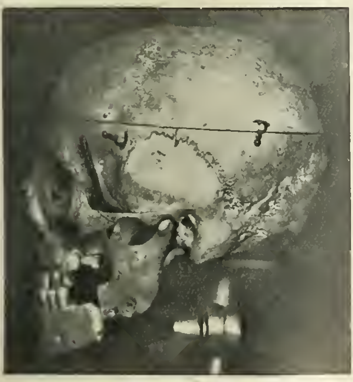


Fig. 7.

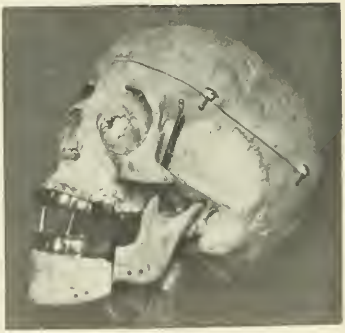


Fig. 8.

fragment to swing forward. To demonstrate this, I have had photographs taken of a mandible with bilateral sections removed. On the right side, commencing at the basal margin, the obliquity extends from behind forwards; and on the left side, where the gap is smaller, the obliquity is in the reverse direction. Study of this gap on the right side shows:—

Fig. 1.—Closed bite, posterior fragment uncontrolled, the early position it assumes, and the interval that occurs between the fragments.

Comparison of this shows:—

Fig. 2.—Open bite; partial control of posterior fragment shows interval between fragments practically identical with fig. 1, owing to anterior fragment moving backwards. The extent of this backward movement is seen by comparison of figs. 3 and 4.

Fig. 3 shows fixed point, bite closed.

Fig. 4 shows same point, bite open.

Fig. 5 shows late position of uncontrolled posterior fragment and a fictitious gap always encountered in bone-grafting in lesions treated on these lines.

Fig. 6.—Study of gap on the left side shows width of this gap and the direction of its obliquity.

Fig. 7.—Closed bite, posterior fragment uncontrolled; contact, if established, occurs between basal and alveolar margin and renders union very problematical. This photograph also shows usual displacement of uncontrolled posterior fragment, where small gap is present and how essential it is to have a lingual extension on flange controlling posterior fragment.

As pointed out by Mr. Cole in his Hunterian lecture, union in this position cannot occur, owing to interposition between the fragments of periosteum and masseter adherent to the posterior fragment in its displaced position.

Fig. 8.—Open bite, posterior fragment uncontrolled; not only shows no obvious objection to splinting in this position, as is so often urged, but a positive advantage, as contact is determined at a lower level than in the closed-bite position.

There may be some fallacies and inaccuracies in comparing the movements of the mandible in the dry state with the movements that occur in the living subject, but that the conditions graphically represented are faithful reproductions of those which obtain in the living subject, has been ocularly demonstrated on the operating table.

The difficulty urged by some of ensuring a correct occlusion in the open-bite position is an imaginary one. It is merely a question of mounting models on an articulator correctly in exactly the same way as should be done for setting up a full upper and lower denture. In fact, for splinting in closed-bite position, it is just as essential to adopt the same procedure, if you wish to be relieved of all anxiety as to whether correct occlusion is established or not, for the teeth are capped and the occlusal surfaces must frequently be separated by a distance of $\frac{1}{4}$ in. Having once mounted the models correctly on an articulator, it is immaterial whether you open the bite $\frac{1}{4}$ in. or $1\frac{1}{4}$ in.

In the early days, Snow's face bow was employed as a routine procedure. For some time, I have abandoned this appliance in favour of an equally satisfactory and far simpler one—viz., an outside spring callipers with spring nut. The only measurements required are the distance from condyle to median alveolar margin of upper jaw, and the transverse condylar diameter less $\frac{1}{4}$ in. allowance for soft tissue coverings. A Gritman articulator has generally been employed, modified to allow movements in all directions, of each part of the divided model.

I have endeavoured to deal exclusively with those features which differentiate our methods from those commonly pursued. Our formula has always been normal occlusion, *plus* mandibular rigidity, as opposed to normal occlusion *versus* mandibular rigidity.

The Operative Treatment of Ununited Fractures of the Mandible.

By PERCIVAL P. COLE, F.R.C.S.Eng.

THE treatment of ununited fractures of the mandible may be designed to cure or palliate. Palliative treatment is afforded by the adaptation of a suitable prosthetic appliance. Cure can only be attained by direct surgical intervention. Palliation belongs exclusively to the dental surgeon. Cure lies in a realm shared equally by skilled dentists and skilled surgeons. The operative or curative treatment of ununited fractures of the mandible is concerned as much with the dentist as the surgeon, and I here take the opportunity of expressing my indebtedness to my dental colleagues and through them to the profession at large, for their invaluable assistance.

For the purposes of this survey fractures may be considered in relation to the extent of bony loss sustained. I shall deal first with those fractures in which non-union is associated with little or no loss of bone. Cases of non-union of this description occur most frequently at or near the angle. The posterior fragment is frequently edentulous and occupies a position internal or deep to the anterior fragment. This type of fracture is eminently suitable for wiring. Imbert and Réal regard wiring as of doubtful value; but in my experience the operation has been uniformly successful. When the anterior fragment contains teeth, the ordinary open-bite bone-graft splint, described by Mr. Bubb, is employed. The posterior fragment is, however, left entirely uncontrolled, as it is obviously impossible to obtain accurate contact if both fragments are immobilized. When the lower jaw is edentulous no splint is employed. The site of the fracture is exposed through an incision extending slightly into the neck with its convexity downwards. The facial vessels invariably need division and ligature. The ends of the fragments are then exposed by cutting through the overlying soft tissues. This incision is made at the level of the lower border of the bone. The ends are then freely bared by the use of a small, sharp periosteal elevator. The posterior fragment is in this way freed sufficiently to allow easy approximation. It is surprising what full exposure can be obtained without opening the mouth. The fragments are then freshened, trimmed and drilled for the passage of the wire. The wire employed is silver No. 18 gauge. Traction is made on the wire, which is twisted when firm contact has been determined. The wound is then sewn up, the question of drainage being decided by the amount of persistent oozing which cannot be checked if much scar tissue is present. If a drainage tube is employed it is removed in twenty-four hours. Nine cases have been dealt with in this way with but one failure. This failure was due to the fact that operation was undertaken before latent sepsis had been eliminated. Infection with some necrosis took place, and further operative measures will be necessary to determine union. In no other case has any suppuration occurred and progress has been uneventful. It is my custom to remove these wires because they are, in my opinion, a source of weakness; because they may at some future time give trouble, and because it is not good that a patient should know of the presence of such a foreign body. Incidentally removal allows inspection of the site of fracture. Knowledge of the conditions actually present has demonstrated that a certain "give" or elasticity at the site of fracture can be elicited for some time after bony union has occurred. More particularly is this the case where at the site of fracture the jaw is shallow, and the neighbouring tooth-bearing alveolus maintains its original depth. This temporary flexibility may be termed "alveolar tilting." It may persist from one to three months, and has frequently led to the diagnosis of non-union with consequent re-splinting and occasionally, perhaps, to operation. All saws, drills and burrs are driven by an electric motor. The Geiger motor used by me is like that of Albee, an American instrument. It is superior to that of Albee in that the whole motor, cords and connexions can be sterilized by dry heat. For this purpose an automatic electric oven is used. The motor is placed in the oven and subjected to a heat of 120° C. for forty minutes. It is lubricated with paraffin, sterilized in an autoclave. Culture experiments undertaken for me in the bacteriological department of the King George Hospital, showed that *Staphylococcus aureus* and *Bacillus pyocyaneus* were killed by this heat in half-an-hour. I have employed this electric motor for more than a year without any mishap attributable to the motor itself.

Plating has been another method employed in the operative treatment of ununited fractures with but slight loss of tissue. Two fractures, involving the ascending ramus have been dealt with in this way. In neither case was any attempt made to secure firm contact. The results have not been satisfactory, and the method has therefore been abandoned. Bony union cannot be expected in these end results unless contact is secured. Contact can only be brought about by traction on the fragments, and it is in this regard that the plate method is defective. A combined plate wire method has been employed in two cases. This method permits the determination of firm contact by traction, and at the same time does away with the necessity of exposing the deep aspects of the ends of the fragments. The difficulties of such exposure, particularly in fractures of the ascending ramus, are so great that this method deserves consideration. Small two-holed silver plates with upturned ends are screwed into the fragments. Under these upturned ends a stout silver wire is passed, tightened until contact is secured and then twisted (fig. 1).

Fractures with Considerable Loss of Tissue.—This group includes all cases of non-union in which the gap is so wide that any attempt at approximation of the fragments would lead to marked deformity and loss of function. Union in these cases can only be determined by the use of a free bony transplant or a pedicled bone-graft. The use of a pedicled graft has obvious advantages. The portion of bone transferred is possessed of blood supply sufficient to maintain its vitality. No question can arise as to its viability or the part played by it in determining union. Hitherto the attempts made to remedy mandibular defects have not been encouraging. Sternum, rib and clavicle have been employed, and the mastoid process has been suggested. The operations have been so formidable, and attended by such manifest disadvantages, that they have been but occasionally performed. A consideration of the behaviour of certain fractures in which large portions of the basal margin were apparently detached, led me to believe that a pedicled graft could be fashioned from this portion of the mandible. Anatomically this portion of the jaw gives attachment to the deep cervical fascia, the platysma, and the anterior belly of the digastric. When the extraordinary vascularity of the soft tissues of the neck is remembered, it seemed clear that from an anatomical standpoint the procedure was feasible. The first operation planned on these lines was performed in June, 1917. Important modifications of the original procedure have been introduced and the technique now employed is as follows. An open-bite splint is fitted and fixed before operation is undertaken (fig. 2). This preliminary fixation is an important advantage to the operator. It steadies the fragments and permits the necessary manipulations to be performed with greater ease and certainty. The open-bite position is essential if intratracheal methods of anæsthesia are employed. With but few exceptions, ether has been administered by intratracheal insufflation. A bone-graft operation cannot be successfully and smoothly concluded unless team work is exploited to its utmost limit. Dental surgeon, anæsthetist, surgeon, assistant and theatre staff must work as component and interested parts of the surgical machine. In these operations the margin for error is so small that consistent success can only be expected by exacting attention to every detail. The incision in the skin extends low into the neck and is carried lower in front than behind (fig. 3). The operation area is isolated by surrounding it with sterile towels. A flap is then turned up consisting of skin only, care being taken not to injure the underlying muscular fibres. Sterile towels are then clipped to the skin margins and bleeding is arrested (fig. 4). The posterior fragment is then freely exposed. The posterior extremity only of the anterior fragment is displayed in order that the size of the gap may be gauged. An incision is then made through the soft parts clothing the

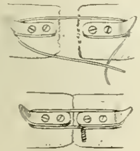


FIG. 1.

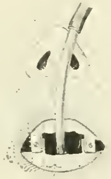


FIG. 2.

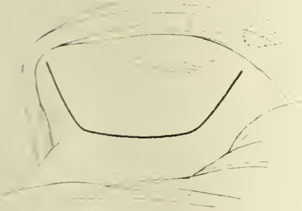


FIG. 3.

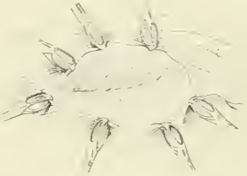


FIG. 4.

outer aspect of the anterior fragment. This incision is parallel with the lower border of the jaw and lies immediately below the level of the buccal sulcus. Along this incision the basal portion of the jaw is sawn off to an extent sufficient to bridge the gap (fig. 5). When the bone is completely divided the periosteum on its deep surface is incised. The bone fragment with its muscular pedicle is then gently freed from the underlying structures of the neck. This process is continued until the bone fragment can be easily adjusted in its new site without undue tension on its pedicle. The extremity of the posterior fragment is then trimmed to furnish as broad an area of contact as possible. Holes are then drilled through posterior and anterior fragments (fig. 6). Through these holes fine silver wires are passed. These wires are made to perforate the pedicle close to its attachment to the bony fragment (fig. 7). They thus surround the graft, and when tightened and twisted secure firm contact with freshened bone on each side of the gap. The deeper structures are united by a few catgut sutures (fig. 8). The wound is

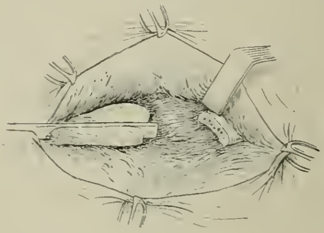


FIG. 5.

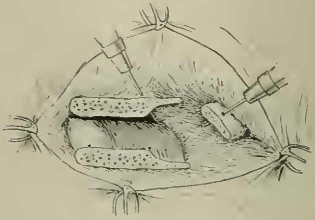


FIG. 6.

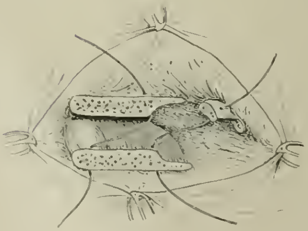


FIG. 7.

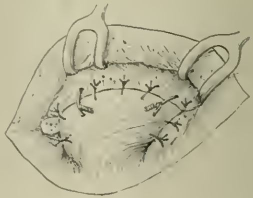


FIG. 8.

then sewn up, drainage being employed for twenty-four hours. The method is applicable to all cases in which the gap to be bridged does not measure more than 3 cm. It obviously cannot be employed in cases where the fracture involves the ascending ramus. It will be found, however, that a large proportion of cases of non-union can be dealt with in this way. The results obtained even in the early cases before the technique was perfected, have been so satisfactory that success in amenable cases can practically be guaranteed.

When loss of tissue exceeds 3 cm. the use of a free bone transplant is indicated. The bone-graft has been regarded with considerable distrust by dental surgeons and surgeons both of this and other countries. Doubt has been freely expressed as to the soundness of the procedure, and as a result numbers of patients have been and are being discharged with ununited fractures. Members of the dental profession, and particularly members of this Section, are frequently in a position to decide for or against operation. Patients have come to me who have been specifically warned against operation, and that in cases peculiarly suitable for surgical intervention. The attitude of uncertainty as to the position of the free bone-graft is largely determined by the antagonistic views freely expressed by Mr. J. F. Colyer in this country, and by such well-known writers as Imbert, Réal and Esser abroad. The best known and most enthusiastic exponent of bone-graft surgery is Albee. This author claims 100 per cent. of successes, and draws special attention to the practical aspect of the question. As Albee so succinctly puts it, "The knowledge of the exact histological rôle which the bone-graft plays is fortunately immaterial to its clinical usefulness whether it serves as an osteo-conductive scaffold or as an active osteo-genetic force."

Treatment from the beginning must be designed on the assumption that a future bone-graft may be needed. Cases in which such loss of bone has occurred have usually suffered equal if not greater injuries to the overlying soft tissues. Any plastic operation undertaken must have as its object the satisfaction of two essential requirements. Endeavour should always be made to prevent adhesion of skin scars to the bone in the immediate neighbourhood of the fracture, and to provide a well-nourished pliable bed, sufficiently thick to admit the consequent adaptation of the graft. I have found the use of decalcified bone of great service in this type of operation. It has constantly been employed in the presence of active suppuration, and on only one occasion has it been extruded. No claim is made that union is in any way assisted by its use, nor has that been the object in view. As regards the technique of the grafting operation itself, the following appear to be the outstanding features. The fundamental principle adopted has been fixation, not only of the fragments but of the graft itself. The greatest difficulty encountered has been exposure of the posterior fragment when that has been left uncontrolled during treatment. This difficulty has been so great and so consistently met with in cases referred to us that it demands emphatic comment. I cannot as a surgeon protest too vehemently against the teaching that advocates the policy of the uncontrolled posterior fragment. Hence, too, the extraction from this fragment of any tooth or root which can in any way facilitate control is strongly to be deprecated. The danger of opening the mouth is, I think, exaggerated. It has only occurred to me on two occasions. As before mentioned, the exposure of the fragments that can be obtained is considerable. Should the mouth be knowingly entered the operation must be abandoned, as septic infection is sure to occur, with the probability that the whole graft will be extruded as a sequestrum. Another sepsis-determining accident is the inadvertent wounding of some lobules of the parotid gland. This happened on one occasion, but though a sinus formed, the graft has remained in position, and a successful result is confidently anticipated. Lindemann records a similar experience with less fortunate consequences. A still further source of sepsis is that which may arise from infection lying latent in the soft tissues. Such contamination is best avoided by delaying operation until at least three months have elapsed from the time that obvious sepsis has completely disappeared. The source of the graft has been the tibia wherever possible. When this bone has been utilized no attempt has been made to conserve the periosteum. Where definite curvature of the graft is necessary to determine correct coaptation, rib has been used. The whole thickness of the bone is employed, and the periosteum on its outer surface has been maintained intact. As far as can be judged no difference in behaviour has been determined by the presence or absence of periosteum. In nearly all cases fixation of the graft has been secured by the use of small silver plates and silver-plated screws. The technique in the case of a tibial graft is as follows: The site of the fracture is exposed through an incision similar to that previously mentioned. The upturned flap is, however, thicker, as no particular object is gained by an endeavour scrupulously to maintain the platysma intact. The extremities of both fragments are freely exposed at the basal margin. These are then trimmed and freshened to provide as broad an area as possible for contact with the graft. The tibia is then exposed by turning back a large flap hinged at the tibial crest. The size and shape of the graft, previously determined by means of callipers, and a pattern cut in sheet lead are then marked out on the tibial surface exposed. Within this area holes suitably situated are drilled and two small silver plates secured in position by small silver-plated screws. The graft consisting of the whole thickness from periosteal surface to medulla is then cut from the tibia by circular saws driven by an electric motor. Graft and attached plates are then transferred to the site of the fracture and fixed in position by two screws perforating each fragment. The grafted area is covered by the deeper soft parts brought together by a continuous catgut suture. A drainage tube is inserted, and the skin wound sewn up. In the case of a rib graft a similar procedure is employed, plates being attached to the rib segment previous to its removal. In only one case has any suppuration occurred in the costal or tibial wound, and this was attended by no untoward consequences. In one case plates and screws were left *in situ*. In other cases they have been removed some months after their insertion, as it was felt that having accomplished their purpose they could only serve as a possible source of subsequent trouble. Opportunity was thus afforded of inspecting the graft, and determining the nature of the changes taking place therein. The graft on these occasions has shown no evidence of independent vitality, but definite evidence of absorption and replacement, these processes being more advanced in the looser and less compact portions of the bone. In one case in which two sinuses made their appearance, from eight to ten weeks after the insertion of the graft, tiny sequestra have been exfoliated. The separation of a sequestrum can only be determined as the result of the action of living upon dead infected tissue. This phenomenon affords additional evidence that the graft is the site of active processes brought about by invasion of its substance by tissue derived from the ends of the living bone. That every endeavour should be made to eliminate sepsis is undoubted, but the advent of mild, localized septic infection does not necessarily determine failure.

Sepsis would appear to determine more rapid absorption, so that deposition of bone is outstripped and lags behind. Consolidation results much more slowly in such a case than in one which has run an aseptic course. These observations are in accord with those recorded by Lindemann, Albee, MacWilliams and Phemister. Eleven cases have been subjected to operation by this method. In one of these, the operation was abandoned as impracticable, after exposure of the fragment. Of the ten cases in which the operation was completed, sufficient time has elapsed to estimate the results in six. Four have been successful; one has been considerably improved, and one has been a complete failure. This gives a success percentage of 60. Of the remaining four, three have progressed so favourably that success is confidently anticipated. No selection of cases has been exercised; every case operated on has been a glaring example of floating non-union, and the gaps have measured anything from 3 cm. to 7 cm. in length. Under these conditions even, there seems no reason why success should not be obtained in 70 per cent. of cases dealt with. If cases are selected, an even higher percentage can be assured.

A brief review of the operative results of all forms of non-union shows that thirty-four cases have been subjected to operation. In two cases operation was abandoned as impracticable. Operation was completed in thirty-two cases. In twenty-two of these, sufficient time has elapsed to estimate results. In sixteen, complete success has been obtained, giving an inclusive success percentage of over 70 for all cases. There has been no mortality and no post-anæsthetic complications. In cases not immediately successful, persistent effort will attain the desired result if the determination of the patient is strong enough to overcome the disappointment and discouragement of initial failure. My estimate of non-union, based on experience gained, is that out of 1,000 unselected cases of fracture treated on ideal lines, non-union will occur in 100. In ten of these, operation to determine union will be impracticable. Of the remaining ninety, it should be possible to secure bony union in at least eighty. Let me finally appeal to you to endorse my conviction that this disabling condition can in the vast majority of cases be dealt with effectively by surgical means; further, that we have failed in our duty to our patients, to ourselves, and to our profession, if we omit to urge the employment of such means, buoyed up in our failures by the knowledge that with greater experience these will become increasingly less frequent.

DISCUSSION.

Mr. NORTHCROFT: I recently stated that I had yet to see a successful bone-graft accompanied by perfect occlusion. Since then I have seen Mr. Cole's results, and I wish publicly to withdraw that statement. It seems a pity that the principle underlying the use of the open-bite method has not been more fully explained before now. The very essence of this method is the control of the edentulous posterior fragment by a padded extension piece, which enables one to think of the mandible as if the fragments were once more in continuity, and the use, then, of an anatomical articulator makes the question of correct occlusion no longer guess work.

Dr. H. P. PICKERILL: Mr. Bubb is right in retaining teeth whenever possible. If the root of a tooth is obviously in the fracture line, acting as a foreign body and introducing sepsis, of course immediate extraction is necessary, but otherwise teeth on either side of the fracture are best retained. In fact I have several cases under treatment at the present time where all the teeth in severe comminuted fractures of the anterior region of the mandible have been retained—with so far excellent results. The method of immediate surgical reduction as against prolonged mechanical or orthodontic methods is good. With regard however to circumferential wiring being *necessary* for the retention of splints, even in edentulous cases, I differ, as it is likely to introduce an unnecessary element of sepsis. I described a method nearly two years ago in the *British Medical Journal* of introducing screws into the under surface of the mandible, the heads projecting through the skin, and of utilizing these as teeth for a submandibular splint. In regard to the "open-bite position" I am still unconvinced by Mr. Bubb's and Mr. Cole's arguments that in this position they can control the posterior fragment, at any rate by the methods shown. In none of the radiograms they have shown on the screen is the posterior fragment controlled or brought into correct position. That an "open-bite" splint is more comfortable to the patient or offers facilities for feeding unobtainable in the "closed" position cannot be maintained—in fact a man with thirty-two teeth in close apposition can be adequately fed and, moreover, will put on weight. Mr. Cole has shown a method of "plate-wiring" which is somewhat clumsy and unnecessary—when simple wiring of the fragments will do all that is necessary. It is quite simple to pass silver wire through holes drilled in the bone in any position whatever, and thus eliminate the necessity for two comparatively large plates, four screws, and the silver wire. With regard to the fixation of grafts, I have no experience of pedicle grafts, but I have used exclusively rib and tibial grafts, and have been very well pleased with results, and certainly think every patient with a definite loss of bone should be given the chance of a bone-graft to re-establish function which no mechanical apparatus can adequately supply. The method of fixation of grafts is of secondary importance so long as adequate adaptation is obtained. Mr. Hey Groves's experiments on cats support this view. Personally, I prefer to mortice a graft into position and then to secure it with fine wire, kangaroo tendon or autogenous bone screws. I quite realize that the "open-bite" position is favoured by Mr. Cole because it obviously suits the pedicle type of graft to have the "vertical" ramus and the "horizontal" ramus in as nearly a straight line as possible.

The PRESIDENT: It is evident from the collection of cases on view this evening that the operation of bone-grafting as a cure for ununited fractures of the mandible has passed beyond the experimental stage into the region of assured success in a very large proportion of cases. But such success can only be expected where a surgeon and a dentist work in close and sympathetic collaboration with the full understanding of each other's aims and efforts. No surgeon dealing with fractured jaws can afford to neglect this operation, and no ununited mandible should be given up as hopeless until it has been given a fair trial.

Section of Odontology.

President—Mr. J. H. BADCOCK.

On the Tubular Enamel of Marsupials.[1]

By J. HOWARD MUMMERY, D.Sc.(Hon.), M.R.C.S.

I HAD intended to confine my demonstration this evening to the tubular enamel of fish, but I should like to add to this a short consideration of certain points in the structure and development of the tubular enamel of marsupials, as a paper has recently appeared in the *Philosophical Transactions of the Royal Society* by my friend Mr. Thornton Carter, on this subject, in which my views as well as those of Mr. C. Tomes with regard to the nature of the tubes and the development of mammalian enamel are very freely criticized, and as the author endeavours to refute the generally accepted views on enamel formation, I think it calls for some reply. This paper is mainly the result of much careful cytological work, it details the changes which take place in the ameloblast cells, and divides the life cycle of these cells into fourteen different stages. I do not propose to deal here with this part of the paper but with the more general considerations of structure and development in the enamel.

I regret I am quite unable to agree with the author on many points, and especially on his main contentions: First, that the so-called tubular enamel of marsupials is not tubular at all, but that what is thought to be the tubule is a colloidal product, and apparently not strictly speaking of an organic nature; and secondly, that the Tomes's processes of the ameloblasts are not processes of the cell.

---

[1] At a meeting of the Section, held April 8, 1918.

Mr. Carter denies the existence of an organic fibrillar basis in enamel, and considers Leon Williams's views on the structure of the enamel prisms to be erroneous; he denies the existence of separating structures corresponding to the outer and inner ameloblastic membranes described in that author's paper, although acknowledging the presence of a dialysing membrane in the latter situation.

As Mr. Carter freely quotes from my paper in the *Philosophical Transactions* he must forgive me if I draw attention to certain inaccuracies in quotation which misrepresent my meaning. He places between inverted commas, an alleged quotation from my paper, in which, moreover, he says he is stating my own words, and makes me say, "there is an essential difference between marsupial and higher mammalian enamels." No such sentence appears in my paper. My words are: "These evidences lead me to conclude that the essential difference between marsupial and higher mammalian enamel lies in the imperfect calcification of the cement substance in the former"; I submit that this does not convey the same meaning.

In the interests of correct quotation, a subject of the highest importance in scientific papers, I must also draw attention to the fact that in this same abstract divided sentences are run together without spacing, and the final inverted commas are omitted. On page 290 there are also two words incorrectly quoted which obscure the meaning of the sentences and tend to render the description unintelligible, and the abstracts from both Mr. Tomes's and my own papers are, in several places, paraphrases, and not quotations, although placed between quotation marks.

There are two distinct views of the nature of the tubes in marsupial enamel: First, that of Mr. Charles Tomes, that the tubes are an enamel product, and due to the mode of calcification of the enamel prisms, as he considers that calcification is a centripetal process, proceeding in the prisms, from without, inwards, and that where tubes are found the process is not completed and has not proceeded to the complete calcification of the centre of the prism, which remains as a tube in the completed enamel; in other parts and in most mammalian enamels the calcification of the prism is complete, and a solid enamel results. These tubes in the enamel, he considers, become connected at the dentine margin with the dentinal tubes, but they are not dentinal tubes, but a product of the ameloblast. The other view is that held by Sir John Tomes, Professor von Ebner, and myself, that the tubes are dentinal tubes, and contain a prolongation of the dentinal fibril.

In order to make clear my observations on the different points under dispute in Mr. Carter's paper, I will arrange the subject under the following heads:—

(I) The nature of the tubes.
(II) The nature of the Tomes's processes of the ameloblasts.
(III) The ameloblastic membranes.
(IV) Calcification.

As Mr. Carter dwells so constantly on the perfect fixation of his specimens, which of course I do not doubt, and suggests that appearances described by others which do not conform to his views may be due to the imperfect fixation of the material employed, I may state that my sections were from material in a very perfect state of fixation, given to me by Professor Symington. These sections bear the internal evidence of having been made from very perfectly fixed material, both by their staining reactions and by the excellent manner in which the relations of the separate tissues have been maintained. I think, also, that I worked a little nearer to life than Mr. Carter; all my preparations, except very advanced germs, were cut without decalcification. I carefully avoided the use of alcohol, paraffin (involving heating), and the notable shrinkage so often caused by clearing agents. The germs were simply embedded in gum, cut on the freezing microtome, and mounted in Farrant solution. Even in sections which Mr. Carter cut without decalcification, he employed the paraffin method. He says: "The amount of shrinkage is extremely slight," so that he does acknowledge that some skrinkage is produced by this method.

(I) THE ENAMEL TUBES.

Mr. Carter appears to regard the so-called enamel tube as a naked fibril, formed within the septa of a honeycomb structure. He considers it to arise "from the coagulation or gel formation of an organic substance not usually present in the colloidal secretion shed by the enamel cells of most other mammals." He would thus interpret the definite persistent structure seen in the enamel of marsupials as part of the "gel" formation of a colloidal material secreted by the ameloblasts, yet he speaks of an organic substance present in this colloidal secretion, which he considers to be of a protein nature. One had always considered that such colloidal product of secretory cells contained the lime salts in suspension, and that calcification took place within it. Analogy would lead us to expect that the colloid would be diffused into an organic basis substance, and not that it would contain this invisible organic material in suspension. The persistence of part of this colloid as a permanent "gel" in the finished tissue is not, it seems to me, consistent with what we know of the physical processes involved in calcification. Uncalcified substances in the finished tissues are usually protoplasmic, and I do not see how the junction of this "gel" substance which composes these fibrils, with the living protoplasmic dentinal fibril, is explained.

That Mr. Carter has seen such a substance in marsupial developing enamel I do not deny, but I cannot consider it has any relation to the true tubular structure of marsupial enamel, and would rather imagine it has probably an intimate association with the formation of the interprismatic substance. Mr. Carter makes the curious statement that his observations "negative the interpretation of the tubular form as the normal one." If not the normal one, how can these tubes ever be present as *abnormal* structures, as, if present at all, they necessitate an entirely different explanation of their mode of production?

That there are tubes, however, in marsupial enamel in the dictionary sense of "a pipe or hollow cylindrical body," and that these tubes form the normal tubular structure of the enamel is capable of definite proof. When a marsupial tooth is injected with alcoholic fuchsin from the pulp cavity, or allowed to take up the stain by capillary attraction, which is just as efficacious, the colouring fluid passes uninterruptedly into the enamel to the finest termination of the tubes. If it is a dry tooth and the openings of the dentinal tubes at the pulp surface are not immediately closed with thick balsam when the sections are mounted, the stain runs out again and is diffused in the mounting medium. Several of my specimens were spoilt in this way, but the running out of the stain clearly indicates that in the dry preparation there is an empty tube in the enamel through which coloured fluids pass (fig. 1). If, however, the same process is carried out with a tooth which has had the soft parts fixed, the stain never runs out, the soft fibril occupying the tube being permanently stained.

In a ground section of a tooth of macropus which had been fixed in the fresh state and stained by Ramón y Cajal's silver nitrate process, the dentinal fibril is stained brown, and has an irregularly dotted appearance, as is often the case when the silver is not fully reduced. This dotted appearance extends into the tubes in the enamel, which are very abundant in this specimen, and the appearances in the tubes of both dentine and enamel are identical. It appears to me that this observation combined with that of Sir John Tomes, who found wavy flexible fibrils projecting from the dentine in his decalcification experiment, affords a definite proof of a soft fibril prolonged from the dentine within the enamel tubes. The same thing occurred in fixed preparations of some teeth of Bettongia, one of the kangaroo rats, which had been treated with gold chloride. We thus see that in dried specimens

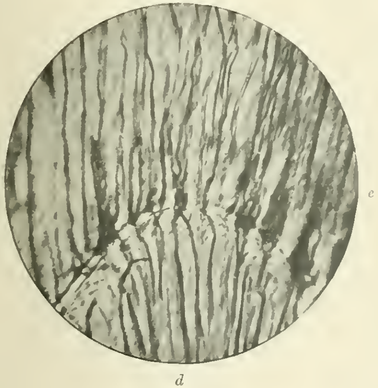


FIG. 1.

Enamel and dentine of wallaby. Tubes injected with alcoholic fuchsin. *e*, enamel ; *d*, dentine.

the stain enters tubes, and that in those in which the soft parts are present, stains produce the same effect on the contents of the tubes both in the enamel and in the dentine.

An interesting structure in Bettongia also affords strong confirmation of the dentinal origin of the tubes, for they are seen to terminate here and there in bulbous enlargements, which contain the same deposit seen upon the fibrils of the dentine. The termination of these tubes in bulbous endings directed towards the outer surface of the enamel, instead of away from it, affords very strong evidence that the tubes are not an enamel product but proceed from the dentine. Another confirmation is found in the fact that the enamel tubes in many places taper down to fine ends as they approach the enamel surface and not towards the dentine as Mr. Carter's structures appear to do in his drawings.

Mr. Carter draws attention to what he considers an inconsistency in my remarks, where he says I describe the contents as granular, while I refer to them later as refractile dots. I think a more careful study of the paper would have avoided this mistake and shown that I was not referring to the same thing. In speaking of transverse ground sections of dry enamel I said that the tubes appeared in some places as refractile dots, and in others were deeply stained. In the transverse sections some of the smaller tubes do not contain the stain and appear as refractile dots as in unstained preparations (fig. 2). This has nothing to do with my first statement, which was referring to the freshly fixed preparations described above, in which the soft contents were present.

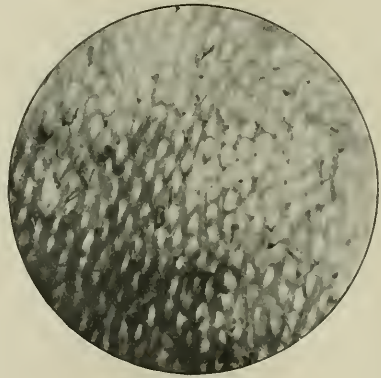


Fig. 2.

Transverse section of enamel of macropus. Alcoholic fuchsin injection. Cross sections of the tubes in interprismatic substance which is also stained. (× 800.)

Again, he says my statements concerning the penetration of the fibril appear contradictory. I scarcely think so. I was contending that

I could find no indication of the penetration of the enamel by tracts of dentine matrix carrying the tubes with them, as suggested by Dr. Paul [5]. I considered that the penetration of the dentinal fibril would be followed by a certain amount of peripheral calcification and thus the formation of a thin-walled tube might be quite comprehensible —the Neumann's sheath is considered to be a tissue on the borderland of calcification but I had not stated the existence of this sheath here, as I have not demonstrated it, and only suggested its presence as a possibility. The evidence of the existence of a tube must be accounted for in some such manner and it was long ago pointed out by Salter that calcification takes place at the ends of tubes where the living fibril is present.

Mr. Carter says that neither Mr. Tomes nor I offer any explanation of the spiral nature of these prolongations. I had long ago considered this and found by experimenting with stiffened threads thrust into gelatine that on passing into the slightly resisting medium they assumed a spiral course. This spiral course is not by any means universal, the tubes are often quite straight or merely slightly wavy, and their form probably depends on the amount of resistance they meet with during their ingrowth. Mr. Carter also states that transverse sections of enamel show the tubes both within and between the prisms. I cannot help thinking that if his specimens had been thin enough he would not have seen them in both situations but distinctly between the prisms, in thick sections the winding of the tubes in some parts makes them appear within the prisms. Even according to his own view of the nature of the tubes I cannot understand how he can expect to find them in both places.

Mr. Carter has never seen the slightest evidence of the existence of any spaces between the prisms, not even at the dentine junction, on the existence of which he says I have founded my theory of dentinal penetration. Here he again suggests imperfect fixation of the preparations, an objection which I have already refuted. Fig. 3 is a photograph of a specimen which had not been decalcified and only disturbance of the sections could produce a false effect of spaces, but these are not disturbed. There are spaces or intervals between the formed material, and these are seen between the prisms (fig. 3) and at the amelo-dentinal junction, and the tubes of the dentine can be seen to enter these spaces. I do not suggest they are empty spaces, which of course they could not be, but they are filled with the colloidal material in which calcification is progressing. In marsupials, however, this process does not proceed to the complete obliteration of the spaces.

As evidence of the tubes being of dentinal origin we have then :—

(1) The free passage of the stain from the pulp cavity into the spaces in the enamel in dried teeth.

(2) The staining by gold and by silver nitrate of the dentinal fibril in fixed preparations, this stain being identical in dentine and enamel.

(3) The bulbous ending of the tubes in Bettongia.

(4) The projection of the wavy fibrils in decalcified enamel.

(5) The appearances in transverse sections.

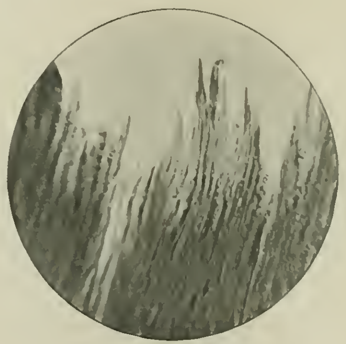


FIG. 3.

Enamel of macropus, showing calcification between the columns of the prisms. (× 700.)

(II) THE NATURE OF THE TOMES'S PROCESSES.

We must consider the determination of the nature of these processes as of the utmost importance in the study of the development not only of marsupial enamel but of that of mammalia generally. If Mr. Carter's views were correct the whole of the present views on the calcification of enamel would fall to the ground. There would be no organic basis to enamel, unless we accept his problematical organic matter in suspension in the colloid as constituting it, and no fibrillar basis. I have certainly never seen the Tomes's processes present the appearances shown in Mr. Carter's figures, 18 and 19, where they are apparently structureless and have no connexion with the ameloblast layer. As I have figured them in my paper on marsupial enamel, the processes which proceed from the cells, as Tomes originally demonstrated, are not tapered to a point as shrunken specimens would suggest, but on the contrary spread out in a fan shape to the forming enamel and are most distinctly fibrillar. Moreover I can trace the cytoplasmic threads of the ameloblast distinctly into these processes and also see them becoming incorporated in the forming enamel, as shown in fig. 4. From these appearances I am quite unable to accept Mr. Carter's explanation of them as a colloidal deposit: they are, I consider, distinctly of an organic nature and a portion of the ameloblast cell, and Mr. Tomes's view that they enter into the formation of the prisms is, I consider, correct. I am sure that no one looking at the specimens from which these photographs were taken could doubt that the processes are prolongations of the cell substance, but Mr. Carter says: "There is not the slightest evidence of the presence of any cytoplasmic structures such as Tomes and Mummery believe to be present"; and again: "In forming marsupial enamel there is no trace

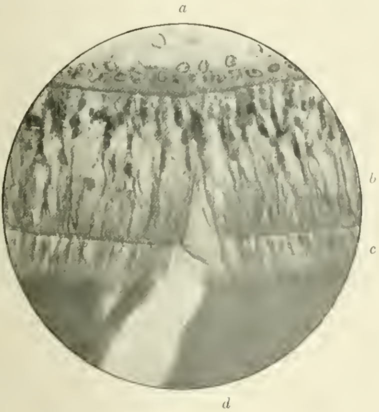


FIG. 4.

Macropus. The Tomes's processes and their incorporation with the forming enamel. *a*, stratum intermedium; *b*, ameloblasts; *c*, Tomes's processes; *d*, enamel. (× 700.)

of the existence of such prolongations of the cytoplasm of the ameloblasts as those on which Tomes has based his theory of enamel development."

If, however, we accept the evidence of the specimens I have shown in the photographs, it appears that Mr. Carter's whole argument on this subject must necessarily fail. These cytoplasmic threads, a prolongation from the ameloblast cells, are blended with the forming enamel and become incorporated with it, forming its organic basis, and we have not to seek the organic substance in a mythical blending of protein substances with a colloid. In forming marsupial enamel the delicate fibrillar substance is distinctly seen and in stained specimens also there are clear indications of it in places where calcification is evidently incomplete. In the dry specimens of Macropus enamel taken from the crypt, the fibrillar nature of the enamel is clearly visible, as I shall presently point out.

(III) THE AMELOBLASTIC MEMBRANES.

The outer and inner ameloblastic membranes were first described by Leon Williams [7]. I quite agree with this author that some separating substance is to be seen between the cells of the stratum intermedium and the ameloblasts and also between the ameloblasts and the forming enamel, as the next photographs will show. I do not pretend to say of what this substance consists, but its presence is indisputable (fig. 5). Moreover these separating structures are not seen in either situation in the enamel germ before the commencement of calcification, and their appearance seems to be determined by the onset of this process. In early stages of the tooth germ, cells of the stratum intermedium may be seen lying between the ameloblasts at their distal ends, but after calcification has commenced I have never seen this occur, and they are distinctly cut off from the line of ameloblasts. That processes pass from the cells of the stratum intermedium to the ameloblasts is evident in many sections, but these processes must pierce the separating substance, whatever it is, which intervenes between the two layers of cells. In the same way the inner ameloblastic membrane appears to depend for its formation on the calcifying process and probably serves, as does the outer one, as a dialysing membrane.

Both Mr. Tomes and Mr. Carter consider it an inexplicable anomaly that the dialysing membrane should be penetrated by the fibrils of the

Tomes's processes; but while Mr. Tomes denies the existence of such separating membrane, Mr. Carter apparently allows the existence of some such structure, but not the processes of the cell, as he considers with Mr. Tomes that we could not have a dialysing membrane which is perforated by processes. It would appear probable that, as Mr. Carter indicates, this inner ameloblastic membrane is formed by the union at their margins of the limiting membrane of the cell on its enamel aspect, as the outer membrane (the existence of which Mr. Carter denies) may also be the thickened cell wall of the distal end of the ameloblast. That the processes in both cases do pass through this limiting membrane there can be no doubt, but an outgrowth of the cytoplasmic fibrils does not necessarily mean a perforation of such membrane; the protoplasm of the cell wall is not a rigid substance pierced with holes like a sieve, as these objections would seem to assume, and is probably perfectly capable of acting as a dialysing membrane although these processes do pass through it, so that although Mr. Carter looks upon my position with regard to these as anomalous, I cannot so consider it. In connexion with this subject it may be mentioned that Ramón y Cajal describes the intracellular bridges of epithelial cells as being covered with a prolongation of the cell membrane.

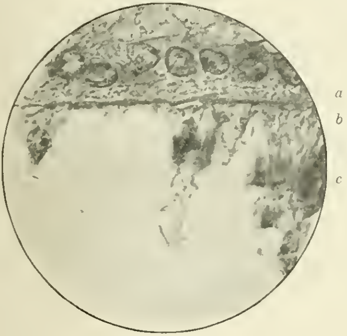


FIG. 5.

Macropus. Ameloblasts partially detached from outer ameloblastic membrane. *a*, stratum intermedium; *b*, outer ameloblastic membrane; *c*, ameloblasts. (× 1,000.)

(IV) CALCIFICATION.

Mr. Carter says that the results of chemical analysis as recorded in the text-books have been arrived at by the ashing method, which he considers gives misleading results. I think he must have overlooked the paper by Dr. Lovatt Evans and the late Professor Underwood in the *Transactions* of the International Medical Congress of 1913, where Dr. Lovatt Evans pointed this out and described his own analysis made by the Frankland method as duly recorded in the text-books both of Tomes and Underwood. Mr. Carter argues that in formed marsupial enamel, "the percentage of organic material is extremely slight, for when sections of adult marsupial enamel are subject to a decalcifying agent, the whole of the tissue, excepting the fibrillar system, is dissolved." By the fibrillar system he would indicate what is usually called the tubular system. I have already described, in my paper in the *Philosophical Transactions*, the result of my own decalcification experiment on adult marsupial enamel. In this experiment I decalcified in strong hydrochloric acid in order that there should be no doubt that the calcifying salts were thoroughly removed. This was added to a drop or two of Farrant solution, in which the section of dentine and enamel was placed, and watched under the microscope. The strong acid removed all the lime salts, and not only did the tubes remain, but also a distinct fibrillar foundation which retained the exact contour of the original piece of enamel, the viscous fluid in which the decalcification took place preventing the washing away by the watery acid of this delicate substance, as occurs when ordinary methods are adopted. Mr. Carter does not attempt to explain the result of this experiment, but merely states there is no such remainder. He considers Leon Williams's description of the mode of calcification of enamel to be erroneous, and denies the separate calcification of the interprismatic substance, as it seems to me without sufficient reason. He describes a sponge-work formation with large meshes in which what he considers to be the fibril is laid down, but which I should much more be inclined to look upon as associated with the formation of the interprismatic substance. He also considers that a further congelation of the colloid takes place with regular meshes, in which the lime salts are deposited to form the prisms, the regular meshes being, as it were, the moulds in which the calcific matter is deposited. According to this view, the directing structure of the prisms is laid down by the colloidal sponge-work and not by the fibrillar basis substance hitherto considered to form the foundation of enamel.

This theory of enamel formation appears to be dependent entirely on the actual nature of the Tomes's processes of the ameloblasts which Mr. Carter considers non-existent, but represented by a colloidal deposit at the proximal ends of the cells and not seen in contact with them. If the Tomes's processes can be shown to be processes of the cell, as I think there is every evidence that they are, Mr. Carter's explanation of the calcification of enamel is altogether inadequate.

Referring to my examination of marsupial teeth taken from the crypt in the dry state, Mr. Carter says: " The enamel is seen to be disposed in a series of prominent ridges, running parallel to the long axis of the tooth. This appearance can only be interpreted by assuming that the forming enamel has undergone incomplete calcification, and so has become distorted in drying. Conclusions based on the microscopical examination of enamel from such a source are thus open to suspicion." It must surely be evident that I examined these teeth for the very reason that they had undergone incomplete calcification, and what Mr. Carter calls distortion in drying is simply the projection of the laminæ of the formed prisms, the interprismatic substance not having become calcified at the outer border of the enamel.

These evidences of the nature of the calcifying process could not be artificially produced, and as far as they are utilized afford a distinct indication of the process. It would be just as reasonable to say that the dried skeleton gives no indication of the anatomy of the body.

I can quite understand that the appearances presented by these dry preparations (fig. 6) cannot be explained on Mr. Carter's view of calcification—for the calcification of the prisms here appears to take place separately, and in a different form, from that of the interprismatic or cementing substance. In confirmation of the conclusions arrived at from the study of these specimens, I will show a very interesting photograph of human enamel which is not open to such criticism, the preparation from which this was taken being a ground section of a Weil preparation in which the fresh tooth was fixed in sublimate. The part of the enamel shown in the photograph (fig. 7) was beneath the lower end of a deep fissure, some little distance from the dentine, in which caries had just commenced, and the resulting acids had etched away the enamel, gradually undoing, as it were, the process of calcification. A comparison with fig. 6 shows that exactly the same structures are seen in the adult human enamel as in the developing enamel of the marsupial. Here there are large calcospherites which have become somewhat fused but not disintegrated, as they are in neighbouring parts of the same preparation, and adjoining the large spherical bodies are tranverse sections of the prisms. In these transverse sections of the partially decalcified prisms the granules are seen which make up the little blocks of the enamel prisms as shown in the previous photograph, but cut transversely instead of longitudinally. As it is quite evident that these larger spherites do not form a portion of the prisms, we must look upon them as constituting a

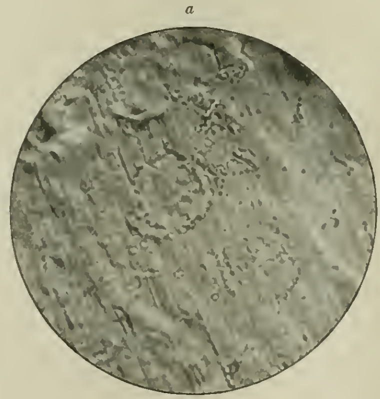


Fig. 6.

From a teased preparation of forming enamel of macropus, showing large spherites and small forming blocks of enamel prisms at *a*. (× 1,000.)

portion of the interprismatic material which is deposited in laminæ within the colloidal substance which surrounds and permeates the delicate fibrillar network forming the organic foundation of enamel. A clearer confirmation of Leon Williams's original statement of the independent formation of the interprismatic substance, could not be brought forward, and I have not found a better confirmation of my own views as to the mode of deposition of the lime salts.

Mr. Carter evidently has not met with the calcospherites which I found in such abundance, both in these and in my fresh decalcified preparations. He criticizes my explanation of Leon Williams's views on calcification where I speak of the enamel columns as being built up like a row of bricks. This statement did not appear in a scientific paper, but in an address to students. I can, however, show one of these bricks which had become detached from the enamel column in a ground section and affords a fairly clear indication of the correctness of Leon Williams's views, but perhaps it has escaped from one of Mr. Carter's colloidal moulds (fig. 8). He says there is no support for any theory which endeavours to explain the appearances found in formed or forming enamel as being due to intermittent rhythmical secretion from these cells. The law of periodicity of growth is, however, well established, and many phenomena point to a periodicity of deposit of the calcifying substances in the living body.[1]

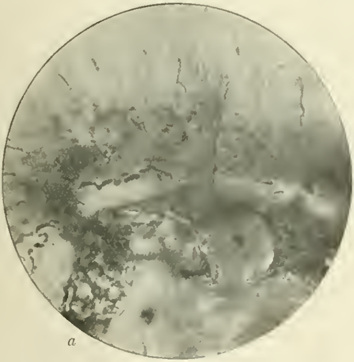


FIG. 7.

Enamel at bottom of a carious fissure. Spherites and enamel prisms in transverse section showing their granular structure, *a*. Weil section, ground. (× 1,000.)

The physiological and physical questions involved in the process of calcification of the hard tissues of the teeth are varied and complicated, and still require further and more complete investigation. There can be little doubt that the more recently investigated phenomena of adsorption which are so intimately associated with surface tension take an important share in the process. It is considered that the phenomena of adsorption depend upon the power of the adsorbed substance to lower the surface tension, and itself accumulating at the surface leads to the formation of membranes and bears an intimate relation to the phenomena of osmosis.

---

[1] *See* "Growth and Form," by D'Arcy W. Thompson, 1917, pp. 157-160.

We may err, as I am sure Mr. Carter would admit, in attributing too much to physical processes and details of structure. We cannot lose sight of the dynamic forces inherent in the cell, the guiding and directing forces which must exist in all cells, and the nature of which we are very far from comprehending. The mere structure of the cell is of very little value in this connexion.

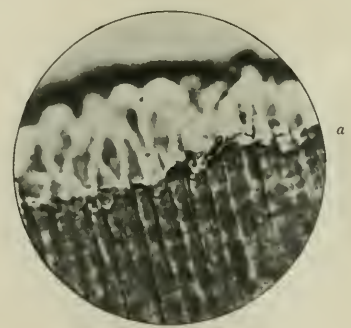


FIG. 8.

Young enamel, ground section, showing a block of enamel substance detached from the column, *a*. (× 800.)

REFERENCES.

[1] CARTER, T. "The Cytomorphosis of the Marsupial Enamel-organ and its Significance in Relation to the Structure of the completed Enamel," *Phil. Trans. Roy. Soc.*, B. 1917, ccviii, p. 355.

[2] VON EBNER, V. "Strittige Fragen über den Bau des Zahnschmelzes," *Sitzungsberichte der Kaiserl. Acad.*, Wien, 1890, xcix, Abt. III.

[3] EVANS, LOVATT, and UNDERWOOD, A. "Transactions of International Medical Congress," 1913, Section of Stomatology.

[4] MUMMERY, J. H. (*a*) "On the Nature of the Tubes in Marsupial Enamel and its bearing upon Enamel Development," *Phil. Trans. Roy. Soc.*, 1914, ccv, pp. 295-313; (*b*) "On the Process of Calcification in Enamel and Dentine," *ibid.*, 1914, ccv, pp. 95-113.

[5] PAUL. "The Enamel Organ," *Dent. Rec.*, 1896, xvi, p. 493.

[6] TOMES, C S. "On the Development of Marsupial and other Tubular Enamels." *Phil. Trans. Roy. Soc.*, 1897, clxxxix.

[7] WILLIAMS, LEON. "On the Formation and Structure of Dental Enamel," *Dent. Cosmos*, 1896, xxxviii, pp. 101, 269, 453.

Mr. MONTAGU F. HOPSON: The major part of Mr. Carter's paper is devoted to an exceedingly able and minute description of the changes which occur in the ameloblast cells of certain marsupials. Mr. Carter finds that these changes differ from those which take place in mammalian ameloblasts generally. This constitutes a new and most important point which must not be lost sight of. I am not convinced of the presence of these fibrils described by Mr. Carter. The evidence which Mr. Mummery has just placed before us and which I have had the opportunity of verifying, tends to support the older view that tubes are present, and the newer view that they are *between* the prisms, following a spiral course around them, and not occupying the axes of the prisms as formerly was supposed. Having disposed of the presence of tubes, Mr. Carter proceeds to deny the existence of "Tomes's processes" as such. He declares them to be but forms assumed by the ameloblastic secretion and purely a metaplasmic product. That the cytoplasmic threads in Mr. Mummery's sections are continuous with the threads of the "Tomes's processes" is beyond question. I speak from a careful and prolonged examination of many sections, in which there is not the slightest sign of any shrinkage. They pass directly from the cell, spread out as he has described, and pass right into the forming enamel. A point has been made that the "threads" in the cell stain somewhat differently from those outside it. Here, surely, the difference in environment must be taken into account. One is inside the cell, the other is prolonged into the ameloblastic secretion. I confess to a difficulty in following Mr. Carter in his subsequent gel-formations which lead to the formation of another sponge work, within the meshes of which the prisms are formed and given their characteristic shape. He denies that the prisms are formed as it were by the fusion of individual blocks, but asserts that the process is continuous and not rhythmic as other authors have described. This being so, how does he account for the individual striation of the prisms? To my mind the real difficulty lies in the difference between the prisms and the interprismatic substance. If, as Mr. Mummery suggests, and indeed he has adduced evidence which goes to prove, that in marsupials the interprismatic substance is late in formation, may it not be that the changes which Mr. Carter has demonstrated in these ameloblasts are associated with this delayed, not to say imperfect, calcification of the interprismatic substance?

The Bruhn-Lindemann Needle Extension for fixing Edentulous Portions of a Fractured Mandible.[1]

By W. H. DOLAMORE.

IN this case the Bruhn-Lindemann needle-extension method has been used to fix the ascending ramus of the mandible, previous to the insertion of a bone-graft. A portion of the bone was lost, following a gunshot injury, and the only mandibular teeth remaining were two molars on the side opposite to the injury. The form of the needle used was that first suggested by Bruhn, illustrated in the *British Dental Journal*, January 1, 1917. To insert this a curved incision is made, the lower border of the bone exposed, and the periosteum separated from its inner surface. A hole is drilled from the facial surface through the cheek and bone, and through this the wire or needle is passed. This wire is fixed on the inner side to a plate, placed between the bone and its periosteum, whilst externally it projects beyond the facial surface, being fixed by a nut, screwed over it on to a thin tin washer. The tissues are then replaced and the wound closed. The wire projecting on the facial surface is joined to a bar, the other end of which is soldered to a splint, fixed to the molar teeth. Thus the two mandibular fragments are immovably fixed. The needle was inserted by Mr. Cecil Joll. The use of this rigid wire considerably prolonged the operation, since it was necessary to enlarge the wound and evert the ascending ramus before the needle could be introduced. This could be avoided by using one or other of the forms since suggested. The operation was performed at the end of July and the apparatus has been worn with comfort and has caused no complication. This time was probably unduly prolonged, and it will be noticed there is a slight cutaneous swelling at the angle, with which it may or may not be connected. It is intended soon to remove it, as it is hoped union of the graft will soon be complete.

The case has been brought forward merely that members may see the apparatus *in situ*.

---

[1] At a meeting of the Section, held December 10, 1917.

Section of Odontology.

President—Mr. J. H. Badcock.

Splints combined with Sutures through the Bone for the Immobilization of Extensive Fractures of the Lower Jaw.[1]

By V. H. Kazanjian.

(Major, Harvard Surgical Unit.)

The purpose of this paper is to outline a new method of splinting for certain types of mandibular fractures which has proved a useful addition to the already accepted procedures. In general, maxillary splints derive their chief anchorage from the teeth and alveolar ridges. The amount of retention depends upon the adaptation and security of such support, and the position of these teeth and ridges determines the type of splint for a given case. When, however, an injury to the jaw includes the partial or total loss of the teeth, the dental surgeon is deprived of the most useful means of retention.

There are certain extensive cases of gunshot wound of the face and jaw which are quite common, and need our serious attention. The term "extensive" is variable, but subsequent illustrations and radiographs will help to explain its use here. We find laceration of the soft tissues, comminution of the jaw, destruction of the teeth, and displacement of the bone. In addition to the large wounds of the face and neck, the oral tissues may be torn from the mandible both buccally and lingually, and often the tongue is swollen to from two to three times its normal size, infiltrated with blood, cut, or even partially destroyed. There exists a comminution of the mandible over a considerable area. Obviously in such cases the destruction of the teeth is great, and few or none remain to serve as a basis for maxillary splints. Furthermore, teeth may have been missing prior to the injury, especially in the molar and bicuspid regions. The displacement is pronounced, with adherent bone lying from 1 to 3 in. from its normal position. It is increased in proportion to the destruction of the harmonious action of the muscles which control the lower jaw. If it is borne in mind that a set of depressor muscles (genio-hyoid, genio-hyoglossus, digastric and mylo-hyoid) are attached anteriorly to the inner surfaces of the mandible, and that the elevators (masseter, temporal, and pterygoids) are attached posteriorly to the angle and the ramus, then it will be seen that the greater the comminution of the jaw and the more serious the laceration of the soft tissues, the greater is the consequent displacement downward of any remaining anterior fragments and the more the displacement upward, forward, and inward of posterior parts. The patients are of course in a weak and depressed condition. The oral tissues are inflamed to such an extent that swallowing, breathing, and feeding become extremely difficult. Moreover, a large percentage of patients have wounds, often equally or more grave, of other parts of the body. Lastly, broncho-pneumonia, hæmorrhage, and septicæmia are not uncommon, and the likelihood of their occurrence will temper the proposed method of treatment.

---

[1] At a meeting of the Section, held December 10, 1917, this paper was fully illustrated with numerous skiagrams and photographs, of which it has been possible to reproduce only a portion.

Past experience has clearly demonstrated that the early fixation of maxillary splints is essential, and the more extensive the injury the more it becomes urgent. It is also true that such a procedure does not create new complications, but on the other hand tends to control them and to lessen the amount of sepsis. The mobility of the bony parts which exists immediately after injury facilitates the technique of fixation; yet the necessary steps must be carried out with caution. All avoidable discomfort is harmful, and often the preliminary work, or even the entire process of fixation, is accomplished while the patient is still in bed. In such cases a combination of maxillary splints, sutures through the bone, and extra-oral appliance has been used to procure positive fixation of the displaced fragments. This procedure will be outlined in the following groups of cases.

(I) Cases of Extensive Comminution of the Mandible; and with Existing Teeth Posterior to the Fracture on Both Sides (Fig. 1).

It is evident that a splint is indicated on the remaining teeth to hold the posterior parts—that is, the rami—in correct position, yet this offers no control over the scattered anterior fragments, the good alignment of which is needed for the ultimate consolidation of the bone. A splint, constructed of bands for the teeth, connected by a heavy threaded arch-wire (German silver, No. 12 A.G.) is cemented to place to keep the posterior segments firmly in occlusion (fig. 2). This arch should follow the mandibular curve at about the normal linguo-gingival margin of the lower teeth. At about its median line a short "T" is soldered, to serve later as a simple and effective support for a removable vulcanite addition to control the contour of the soft tissues. Wire sutures are then passed through the anterior bony fragments to lift them toward the arch into a natural alignment and contact. (In the same manner where the mandible is fractured horizontally the lower segment is lifted to its former position in proximity to the main part, instead of being left as an isolated portion.) The treatment is illustrated by this case (figs. 1 and 2):—

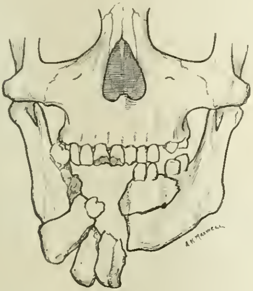


FIG. 1.

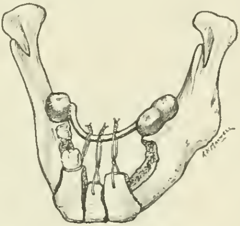


FIG. 2.

Case I.—Private M. was wounded on October 7, 1916, and admitted to hospital on October 9. There was an entrance wound on the right side of the face near the angle of the mandible, and an exit wound on the left side of the chin at the bicuspid region. The sublingual tissues were severely lacerated, and partially separated from their attachment to the lingual aspect of the mandible. The tongue was swollen and infiltrated with blood. The mandible anterior to the molar was comminuted, and the fragments were drawn downward and backward toward the base of the tongue; while there remained a horizontal portion of the lower border at the right bicuspid and molar region. The site of the fracture was exposed by the sublingual laceration. The left lateral and cuspid, together with the alveolar process, were loose as one segment. On October 11 an operation was performed under local anæsthesia for the removal of loose process, roots, and useless fragments of bone. On October 14, a temporary band and wire splint were adjusted, which extended from molar to molar. On October 16 a profuse hæmorrhage occurred from the right side of the mouth, probably from the lingual artery. It was arrested temporarily by packing, and later controlled by ligation of the right external carotid artery (Mr. H. Burrows). On October 21 the splint was removed, and the three roots on the left side and the right second molar were extracted. A new band and wire splint were cemented to place, immobilizing the posterior fragments, but there remained a gap in the right anterior region. Holes were drilled through the anterior fragments, which were lifted to position and suspended to the arch by means of brass wire. Necrotic bone was removed from time to time, and eventually a removable vulcanite splint was added to maintain the contour of the lower lip. On November 9 the patient was evacuated to England. The skiagram showed that the bony parts were in good continuity and alignment. The splint was removed and digital examination showed a firm union at all points except the right molar region, where there was a slight mobility. It was therefore considered advisable to re-cement the metal splint before evacuation.

Case II.—Private W. A. was wounded on August 6, 1917, and admitted to hospital on August 13, with extensive laceration of the lower lip, sublingual tissues, chin, and neck as far as the base. Attempts had been made to close the wounds at a casualty clearing station, but within a few days all the sutures had given way (fig. 3). The mandible from the right bicuspid to the left molar region was comminuted and the resulting fragments were greatly displaced (fig. 4). On August 17 the jaw was immobilized on the same principle as in Case I (fig. 4A). On August 20 the soft tissues were sutured under a local anæsthetic. On October 10, the wire sutures which held in the anterior fragments were removed with some small pieces of necrosed bone. A removable vulcanite piece was fitted to maintain the contour of the lower lip. On August 25 the patient was evacuated to England. The soft tissues were healed, the scars were slight, and there was no facial deformity. Skiagrams showed that bony union was taking place satisfactorily, but there were rarefied areas in the bicuspid regions (fig. 5).

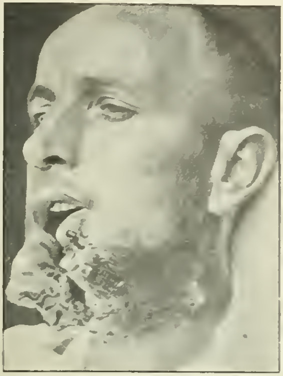


Fig. 3.

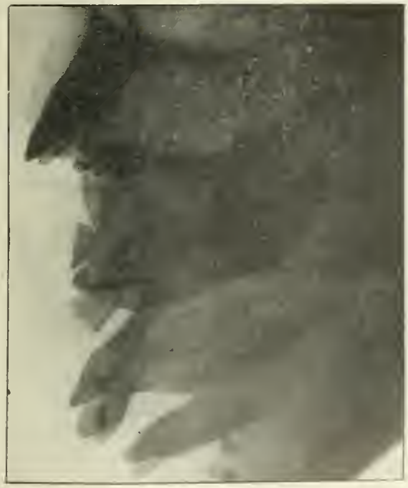


Fig. 4.

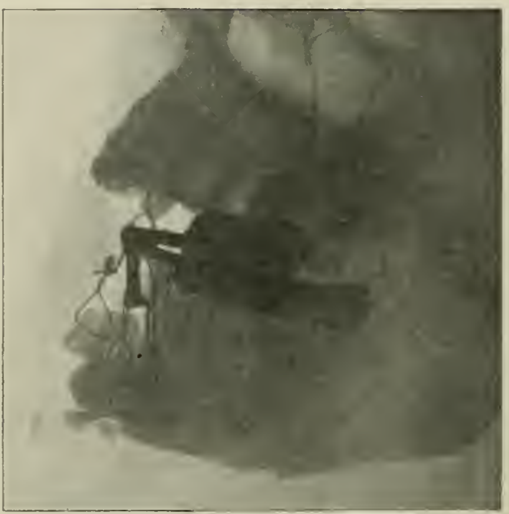


Fig. 4a.

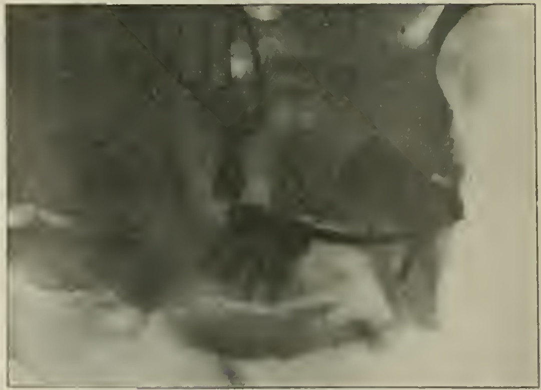


Fig 5.

(II) Cases in which the Bony Injury is of a Similar Nature, but Serviceable Teeth remain on one side only posterior to the Fractures (Figs. 6a, 6b).

In the type described under (I), the fracture and displacement may be extensive but the availability of teeth on both main segments facilitates a secure anchorage of the splint. In this type (II) the absence of teeth on one side—either as a result of the injury, or of previous extraction—is a distinct disadvantage. The ramus of the edentulous side is usually displaced inward and upward: a condition which must be overcome both for the approximation of the segments of bone, and for the preservation of a sufficient inter-maxillary space for future dentures or oral restorations. This type is treated by one of the two following methods:—

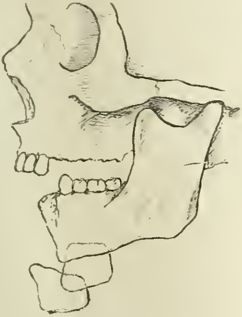


Fig. 6a.

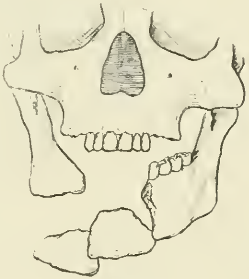


Fig. 6b.

(I) To the teeth of one side are fitted metal bands which carry an arch-wire as before, the free end of which is attached to a hole in the ramus of the edentulous side (fig. 7). In this manner the main segments of the mandible are made secure, while the anterior segments are suspended as before by means of brass sutures. A supplementary support is given to the whole by an upper swaged splint, with hooks as for intermaxillary ligation.

(2) At times the condition of the mouth may not be suitable for attachment of the free end of the arch in the bone. In such a case the

arch extends to the bicuspid region only (fig. 8), and suspension of the fragments is made to it. A vulcanite intermaxillary splint is supplied to control the edentulous side, and to offset its upward and forward tendencies.

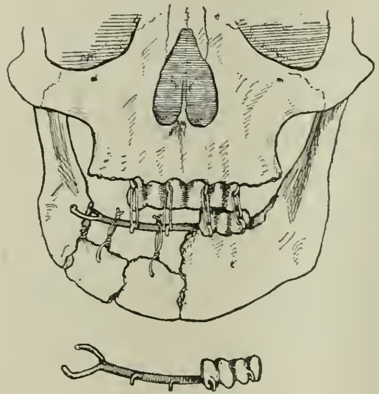


Fig. 7.

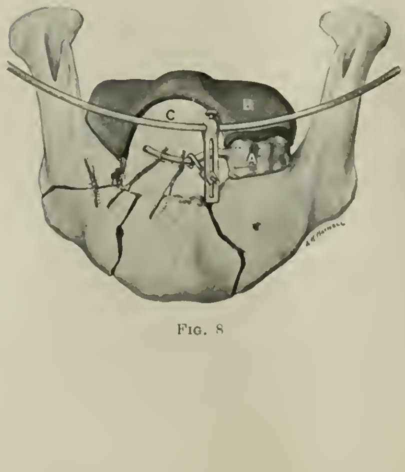


Fig. 8

(III) CASES IN WHICH THE EXTENSIVE FRACTURE REACHED FROM ANGLE TO ANGLE, WITH NO EXISTING LOWER TEETH.

The same general principles hold for the immobilization here, but slight modifications of technique are necessary. The arch-wire is attached to both main posterior segments, and to it the anterior fragments are suspended. An upper swaged splint with hooks is used to keep the lower appliance in position by intermaxillary ligation, and the intermaxillary vulcanite splint controls both rami (fig. 9).

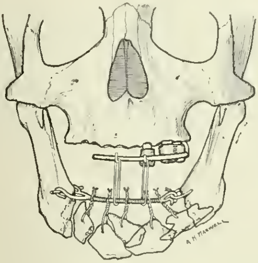


FIG. 9.

Case III (figs. 9 and 10).—Private Ch. was wounded on March 6, 1917, and admitted to hospital on March 16. There was a large wound of the right side of the face, extending from the right corner of the mouth nearly to the lobe of the ear. The laceration included the mucous membrane of the cheek, and the submaxillary region. Three-quarters of an inch of the tip of the tongue was destroyed, and it was much swollen. A small piece of shrapnel was lodged superficially, anterior to the right ear. The bony comminution involved the anterior wall of the right antrum, and all upper teeth from the right lateral to the third molar inclusive were destroyed. The central incisors and left lateral were fractured as one segment, but the remaining parts of the maxilla were firm. In the mandible all teeth and alveolar process were destroyed, and the comminution involved the entire body of the bone. The resulting fragments were displaced downward, and were partly exposed, as were also the ends of the rami. On March 17 a few remaining roots and certain useless pieces of bone were removed under local anæsthesia. On March 18 the lower segments were pulled to alignment and immobilized by attaching the arch wire to the ends of the rami for their suspension (fig. 10A). On April 2 the soft tissues were partially sutured, no attempt being made to close the entire wound. On April 4 some of the small wire sutures were removed,

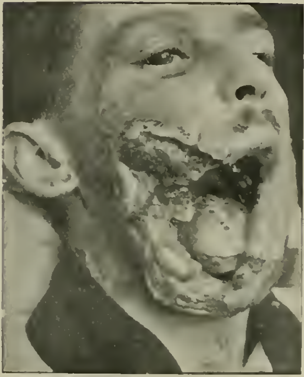


FIG. 10.

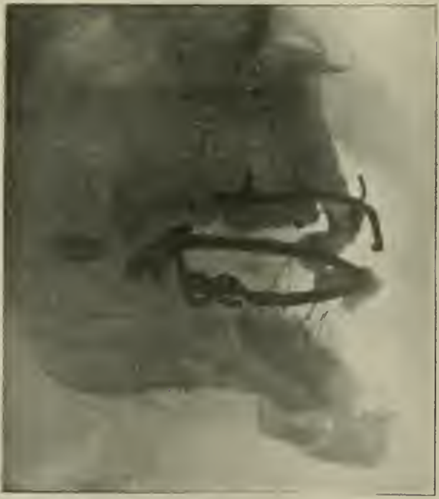


FIG. 10A.

with sequestra of bone, leaving the wire arch intact and still supporting certain parts until May 17, when all splints were replaced by a vulcanite intermaxillary splint. A chin-piece and head-gear were used externally for upward support. On June 20 a plastic operation was performed on the right corner of the mouth. On August 4 the tongue was lengthened by an operation.

Present Condition.—Adhesions inside the mouth have been cut. and the union of the jaw is nearly complete, except for slight mobility on the left side, which will disappear in time (fig. 10B). The mandibular arch presents a shortened appearance with some retraction of the chin. Dentures have been supplied.

FIG 10B.

Case IV.—Private O. was wounded on April 21, 1917, and was admitted to hospital on April 25. There was a wound about 3 in. long on the left side of the face, lacerating the angle of the mouth, the lower lip, the tongue, and the submaxillary region. In the upper jaw the teeth and the alveolar process from the right cuspid to the left second molar were fractured and very loose. The comminution of the lower jaw extended from the angle on the right to the left second bicuspid region, but the left bicuspids and molars were destroyed. At least four pieces of bone of appreciable size (the remnants of the lower border of the mandible) remained and were pulled downward toward the base of the tongue (fig. 11). On April 29 both jaws were cleaned of useless teeth and alveolar process under local anæsthesia. On May 5 the lower jaw was immobilized as in (III) (fig. 11A), and an intermaxillary interdental splint was fitted to give occlusal contact to the posterior fragments. On May 9 the facial wound was completely closed under novocain. On May 17 the wire sutures through the bone were removed, and a new vulcanite splint was used. Additional outside support was supplied by a chin-piece and head-gear. On October 11 the tongue, which had been partially destroyed, was elongated by about $1\frac{1}{2}$ in.

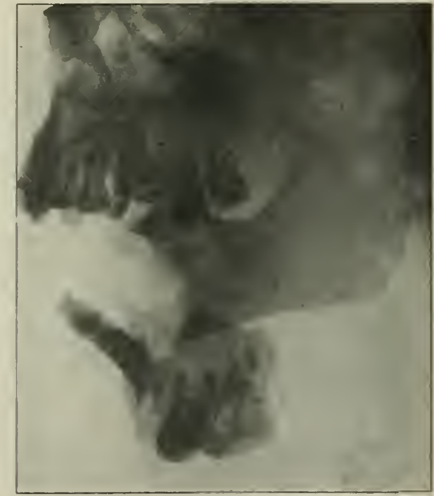


FIG. 11.

Present Condition.—The remains of the mandible which were brought to alignment have consolidated (fig. 11B). In this case also the mandibular arch is shortened antero-posteriorly, but the deformity is slight. At different times bony sequestra have been removed as they appeared or began to loosen. After the removal of the original lower appliance with the wire sutures, the chin showed a slight tendency to recede, and a screw was placed in the bone at about the median line. By means of an extra-oral appliance the mandibular arch was again pulled forward. Upper and lower dentures have been supplied.

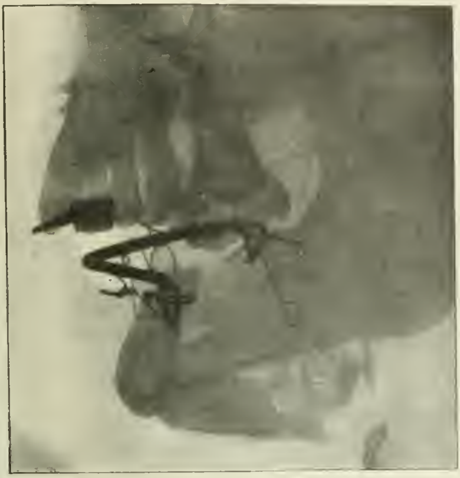


Fig. 11A.

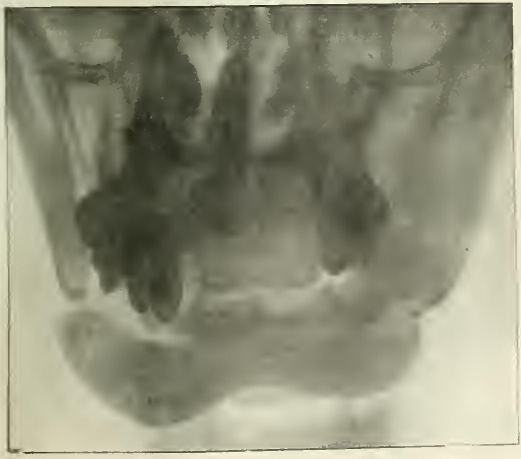


Fig. 11B.

(IV)

The upper jaw is sometimes unavailable as a means of support to the lower splints, because of the destruction of teeth, fractures, loss of tissue, or because the patient was edentulous prior to injury. A substitute retention must then be used.

In the treatment of this condition the parts of the lower jaw are assembled as has been shown in (I), (II), or (III). If the upper jaw is edentulous, partially fractured, or has lost teeth and alveolar process only, the upper vulcanite splint is used invariably to preserve a proper intermaxillary space during the period of consolidation of the jaw.

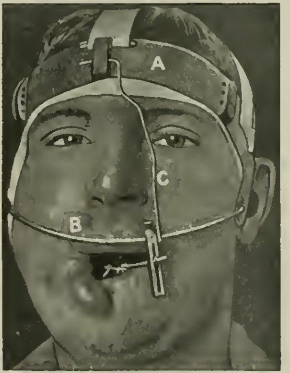


FIG. 12.

This course, however, up to this point, has not provided the upward support to the lower jaw, which was ordinarily obtained by an upper swaged splint, and therefore an extra-oral device is necessary. A headgear is constructed in this way (fig. 12). Gutta percha, 4 mm. in thickness, is softened in hot water and fitted to the forehead and temporal regions, and held in place after it has hardened by straps of webbing. From the lower ends—at about the level of the tragus of the ear—a heavy arch-wire passes in front of the mouth. The latter is controlled by a stiff wire which is fixed in the median line of the gutta percha. This large arch is rendered rigid, and serves as the foundation for suitable removable attachments to support the intra-oral splints, or in other cases the tissues of the nose, eye, cheek, and neck. Special adjustable nuts are put on it for such extensions as will support the lower arch wire (fig. 8).

The two following cases represent types in which the use of extra-oral appliances was necessary:—

Case V.—Driver W. was wounded on October 22, 1916, and admitted to hospital on October 24. There was a small entrance wound in the lower right first molar region, and an exit wound which resulted in the laceration of the lower lip, the sublingual tissues, and the right side of the chin. In the upper jaw all teeth were destroyed, with some alveolar process. The wall of the right antrum was loose. The comminution in the lower jaw extended from the right molar to the left bicuspid region. The only remaining teeth were the left lower bicuspids and molars. Several anterior fragments were displaced toward the base of the tongue. On October 30 a hæmorrhage occurred from the right ranine artery. It was possible to ligate the bleeding point immediately. On November 2 the upper and lower jaws were cleaned of useless fragments of bone and fractured roots under a local anæsthetic. Free drainage was allowed for

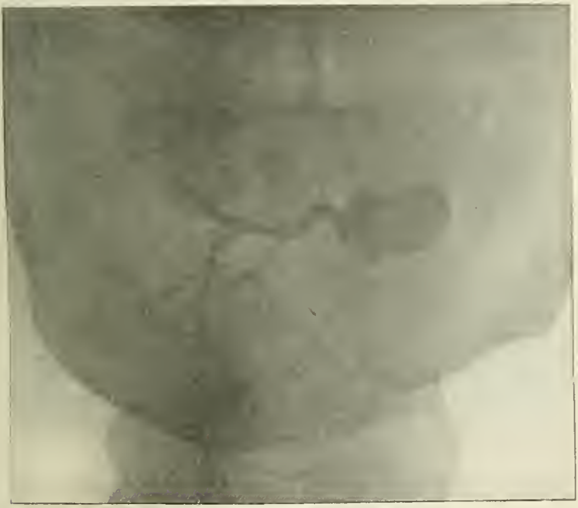


FIG. 12A.

the right antrum. On November 15 a splint was used to immobilize the lower jaw, as has been described in (II) (fig. 12A). An extra-oral appliance was used to support the lower splint, since no upper teeth remained (figs. 8 and 12). The wire sutures which supported the anterior fragments remained for about four weeks, and were then removed. A vulcanite lip splint was made to fit over the intra-oral arch-wire. On February 13 a plastic operation was performed under local anæsthesia for the closure of the wound. On June 6 the patient was evacuated with a satisfactory consolidation of the bone. Upper and lower dentures were supplied.

Case VI.— Private C. was wounded on February 28, 1917, and admitted to hospital on March 1. The projectile entered near the left side of the nose, causing only a small wound. It travelled obliquely downward, lacerating the right side of the lower lip, the chin, and the neck. There was extensive inflammation of the tongue, sublingual tissues, and of the neck. The upper jaw was uninjured, but the patient was edentulous. The lower jaw was comminuted from the right angle to the left first bicuspid. The only teeth remaining were the left bicuspids. The bony fragments were displaced downward, inward and backward (fig. 13). On March 13 the necessary impressions were taken for the construction of splints. On March 17 the lower jaw was immobilized (fig. 14) as is shown in type (II) and in Case V, and the wound was partially sutured under local anæsthesia. On March 20 a head-gear was adjusted (figs. 8 and 15), and the immobilization of the lower jaw was completely effected by suitable attachments to it. Eventually the wire sutures and various pieces of necrotic bone were removed, and a vulcanite splint was used to keep the

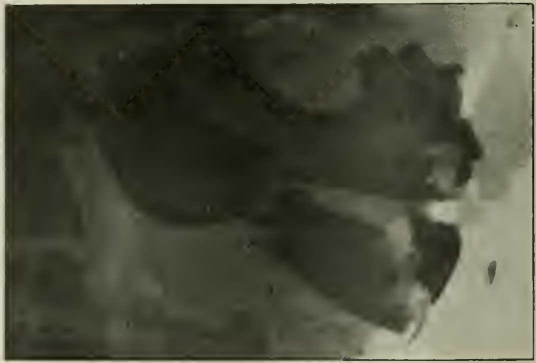


FIG. 13.

contour of the lip and the chin. On March 28 a plastic operation was performed to remove the facial scars and to correct the right corner of the mouth. The patient was evacuated to England on September 1. The union of the jaw was complete. The two lower left bicuspids were in a healthy condition, and upper and lower dentures were supplied. The patient writes that the jaw has since remained in a satisfactory condition.

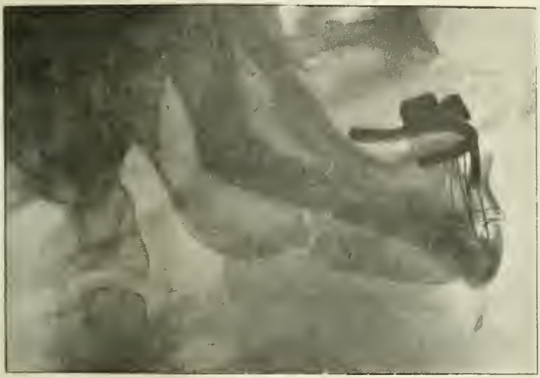


Fig. 14.

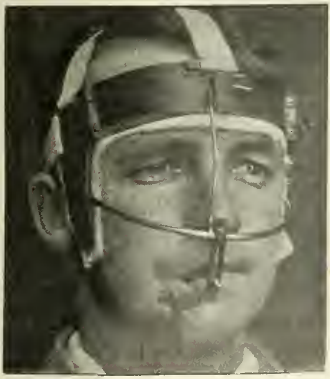


Fig. 15.

TECHNIQUE OF THE OPERATION.

The necessary steps are performed as soon as possible after injury—preferably within a few days. It will be observed that the sutures through the bone are done in the mouth and not through soft tissue incisions. The earlier the treatment is begun the easier the steps are carried out, as the holes for the sutures may be drilled painlessly while the bone is still partially denuded. When it becomes necessary to separate the soft tissues slightly from about the fragments, local anæsthesia is indicated, since under a general anæsthetic the work would be difficult for the operator, and the patient would be submitted needlessly to the possibilities of complications.

Absolute approximation of all fragments is probably not obtainable, nor is it an absolute necessity; the objects are to approach this ideal, and to get all the bony contact possible. Often the parts will have to be moved laterally as well as upward to get the continuity.

The intra-oral arch-wire which is soldered to the bands is No. 14 A.G. if made of German silver, and is threaded to facilitate the attachment of the wire sutures at any point. The wire which is used for the sutures through the bone may be either of silver or of brass; if of the latter, similar to Dr. Angle's fracture wire.

If at times it is difficult even with a local anæsthetic to expose certain bony parts from deep-seated positions for the drilling of holes, it is convenient to denude only a small surface into which a light screw is fastened for the attachment of the wire. Usually the wire sutures or screws will not be exfoliated before from three to five weeks, and by this time the initial consolidation of the tissues will have set in.

In the completely edentulous type, class (III), two methods may be employed for fixing the arch to the ends of the rami; of these two the first is more positive, but more difficult, while of the second the opposite is true.

(1) A small wire fork of softer metal (as Victoria metal No. 16 A.G.) is soldered to each end of the arch. The hole in the bone is drilled sufficiently large for this to be pinched into it; one end of the fork buccally and the other lingually (*see* fig. 7).

(2) A soft wire is passed through the hole in the posterior segment and tightened to make a ring. On the ends of the arch the weaker wire is again soldered to form a sort of claw, which is passed through the ring and pinched (*see* fig. 9).

Auxiliary Supports.—Unquestionably additional pressure properly applied under the chin, whether by means of chin-pieces, pads, or bandages, is of considerable assistance in the treatment of these types of wounds. Yet unfortunately, often in the early stages when such support is most needed, the nature and the location of the injury do not allow the application of any appreciable force to the soft tissues. When it is possible the correct use of a chin-piece is to be recommended. A chin-piece is designed to give upward and forward pressure (figs. 16 and 17), in order to offset the action of the depressor muscles. Gutta percha is fitted to the chin and neck, and connected to the head-gear by two rods which pass to points in front of the ears. It is constructed in such a manner that two sets of elastics control it; one to pull it forward, and the other to pull it upward.

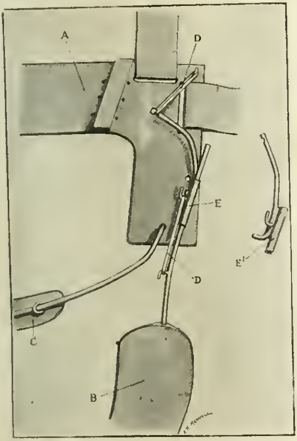


FIG. 16.

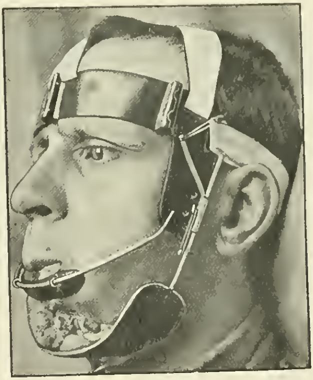


FIG. 17.

It might seem that this treatment for extensive injuries of the face and jaws would overburden the patient with uncomfortable and unclean appliances. However, such is not the case. The extra-oral parts can be taken off daily by the nurse or by the patient, and when vulcanite splints are inserted, the patient himself can remove them for feeding or dressings—except when he has wounds of the hands or arms. The intra-oral metal splints and wires are small in size, and frequent irrigations leave them in a clean condition. Free drainage of the mouth and the wounds is essential, and any operation to suture the face or neck must not interfere with it at too early a date.

No complications have arisen through drilling the small holes in the bone; perhaps because no laceration or incisions of the soft tissues have been necessary.

This method is, of course, chiefly for use in extensive cases where few or no teeth remain; but it can also be employed to less severe injuries. Often when metal splints are used on the lower teeth with a bar bridging the site of a comminuted fracture, smaller pieces of bone may be suspended by wire sutures for a time, with the result that a fibrous union is avoided. The early fixation does not duplicate a normal jaw, but the attempts to construct a bony continuity are justified by the results. The regenerative power of the bone is great, and if the fragments are placed in contact and alignment, experience has shown that a jaw has been formed in cases which were apparently hopeless. The fact that there may result alignment without union simplifies such operative procedures as osteotomy and bone-grafting. If these measures are not indicated, the mouth, at least, is in a better condition to receive prosthetic restorations. By the timely immobilization and alignment of all tissues, a more respectable facial contour and chin prominence have been preserved, while the reduction of the muscular tension makes the wound smaller and the earlier suturing easier.

I desire to express my indebtedness to my colleague, Captain F. Brigham, R.A.M.C. (H.T.C.) for his kind assistance in formulating this paper with many of its illustrations; and also to the Medical Research Committee for the services of Sergeant A. K. Maxwell, in preparing valuable drawings.

Arthroplasty of Temporo-mandibular Joint for Ankylosis.[1]

By H. P. PICKERILL, M.D.

THE following case is interesting from its comparative rarity and on account of the excellent result obtained by radical operation. The patient (Lance-corporal W.) was wounded twenty-one months ago (August 20, 1916) by shrapnel, causing a lacerated wound from below the left ear to the left eye. The wound was closed in France. The patient went to various hospitals and on November 21, 1916, there is a note that the jaw was getting stiff and the little finger only could be inserted between the incisor teeth. Attempts to open with gag produced no improvement. The X-ray report April 24, 1917, reads: "There is no sign of fracture of ascending ramus. The joint surface appears a little roughened." X-ray report, July 8, 1917: "I do not think there is ankylosis of temporo-mandibular joint, ? locking of jaw owing to overgrowth of callus." X-ray report, February 22, 1918:

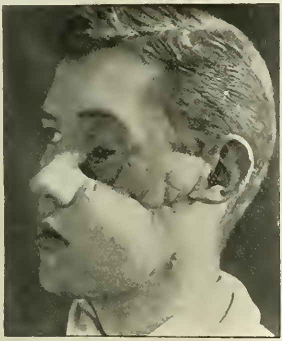


FIG. 1.

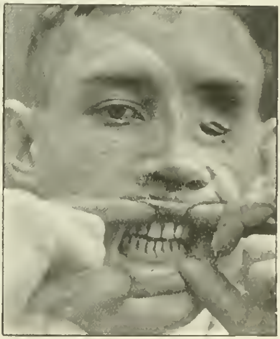


FIG. 2

Fig. 1 shows extent and position of wound.

Fig. 2 shows maximum amount of opening of teeth prior to operation.

---

[1] At a meeting of the Section, held April 8, 1918.

"Arthritis of left temporo-mandibular joint. Fracture of zygomatic arch and comminution of the coronoid process."

In February of this year the patient came under my care. The condition then was that the incisors could be separated a quarter of an inch and the jaw then became absolutely locked. The zygoma could be felt to move slightly in its anterior third. The wounds were healed and the eye had been enucleated. I decided to explore the joint.

Operation, February 28, 1918: Rectangular incision, above zygoma turning down over position of condyle and downwards anteriorly over position of fracture in zygoma. On exposure of the zygoma and neck of condyle, it was found that there existed a dense osseous union between the two on a plane lateral to the joint. The coronoid process was adherent to the anterior part of the zygoma by dense fibro-cicatricial bands. An attempt was made to excise the ankylosed portion without removing the head of the condyle, but this having been done, it was found on exposing the joint that the latter was totally disorganized and densely adherent to the remains of the glenoid fossa. The head of the bone was therefore also removed. In order to prevent a fresh ankylosis—fibrous or osseous—a flap of temporal muscle was

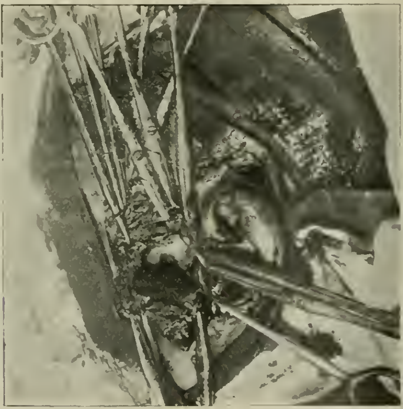


FIG. 3.

Shows condition found at operation—*neck* of mandible ankylosed to zygoma.

turned down and interposed between the glenoid fossa and the neck of the mandible and sutured in this position. The adhesions between the coronoid and zygoma were freely removed, and the freedom in jaw movement was immediate. A small appliance was inserted in the mouth between the teeth on the left side to prevent the left ramus from being unduly elevated.

The patient's present condition is that he can open his mouth quite widely; he has no pain, and the articulation of the teeth on both sides is almost, if not quite, perfect. He cannot masticate hard substances yet, but as he has not masticated anything for 21 months, this is not surprising, and it will, I have no doubt, soon be remedied. No stretching nor forcible instrumentation have been applied since the operation.

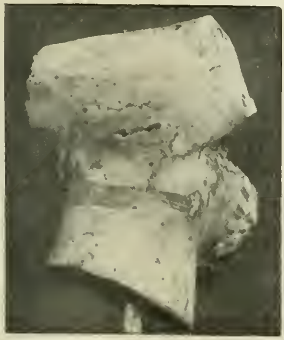


FIG. 4.

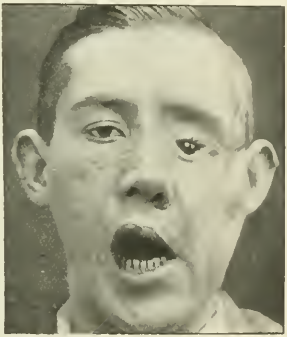


FIG. 5.

Fig. 4.—Portion of zygoma, condyle and neck excised.
Fig. 5.—Shows extent of voluntary opening after operation.

This method of dealing with ankylosis is, I think, to be preferred to Esmarch's operations for the following reasons: (1) It can be done aseptically. (2) To get a corresponding opening between the teeth, less bone has to be removed. (3) The actions of the temporal masseter and internal pterygoid muscles are preserved. (4) There is no trouble from hæmorrhage as there may be from the inferior dental artery. (5) There is no necessity to injure the facial nerve if the vertical incision is not carried too low. (6) There is much less likelihood of recurrence.

The "Screw-lever" Splint.

By H. P. Pickerill, M.D.

This new form of splint, which for want of a better name I term the "Screw-lever" splint, is designed to control misplaced fragments in the anterior region of the mandible. The displacement in this region is usually backwards and downwards owing to the pull of the digastric, geniohyoid and platysma muscles. If such fragments are to be retained and maintained in opposition, a force must be applied in a direction opposite to the direction of muscular "pull." This splint, by means of the padded submandibular lever, exerts pressure in an upward and forward direction, at the same time clamping the teeth and mandible and yet allowing free movement of the jaw as a whole. This I regard as extremely important, believing that function should be maintained throughout treatment, or be permitted at as early a date as possible.

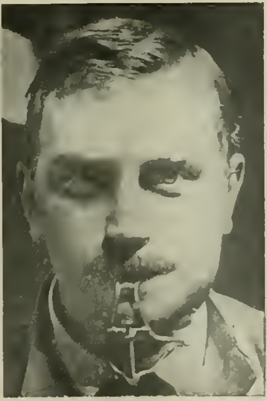


Fig. 1.

The splint consists essentially of an intraoral metal cap splint, to which are attached two arms, passing out of the mouth and under the

---

[1] At a meeting of the Section, held May 6, 1918.

mandible. Between the ends of these arms a lever is hinged bearing posteriorly a pad of "Stent," and anteriorly a small cap or threaded nut on which a long screw, attached higher up the arms, impinges. Thus, by lengthening the screw, the posterior pad rotates upwards and forwards and carries any displaced fragments with it in the desired direction. The accompanying illustrations show: (fig. 1) the splint in action; (fig. 2) a typical case for treatment by this method; (fig. 3) result after the "Screw-lever" splint had reduced the fragments and a metal cap splint substituted. Retention of all the teeth will be noted, although all the incisors, canines, and premolars were involved in the fracture, and also the increasing consolidation taking place in the region of their apices.

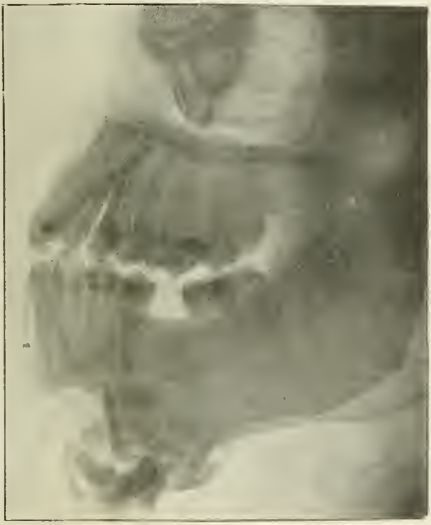


FIG. 2.

This splint introduces a rational method for the retention of teeth and fragments which would otherwise have to be sacrificed. The usual form of splint suspends the teeth by their crowns against the force of gravity and the force of the depressor muscles, and no attempt is made to produce and maintain approximation of the fragments and teeth—they remain separated and hence have to be removed. The use of the "Screw-lever" splint obliterates all "dead spaces," effects and maintains close approximation of teeth and fragments, and I find the majority of both can thus be successfully retained.

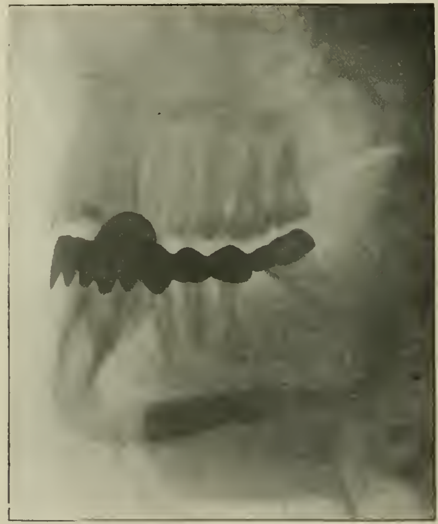


Fig. 3.

Section of Odontology.

President—Mr. J. H. BADCOCK.

The After-death Destruction of Teeth and Bones by Mould Fungus.[1]

By F. J. BENNETT, M.R.C.S., L.D.S.

BONES and teeth which have remained at rest and undisturbed in the dark, especially with access to a damp atmosphere, are apt to be covered with a growth of mould, which adheres to and penetrates their substance in a varying degree, according to the length of time they have been subject to it.

The growth can easily be seen by means of a hand lens, and will be found passing from the exterior by channels formerly occupied by blood-vessels, in the case of the bones, or through the pulp cavity or the dentine at the neck of the tooth or any exposed surface of cementum or dentine.

Examined more closely the growth is found to belong to that class of bacteria called hyphomycete, which develops by means of spores. The general type of growth is as follows: Starting from a single spore, two or three threads begin to sprout from it, then elongate and form the mycelial threads which radiate from the spores and are of unequal length. From these primary threads lateral branches spring, forming a dense tangled mass of mycelium.

The branching threads then segment, degeneration occurring at intervals within the mycelial sheaf, and reveal rod-shaped segments. Fragmentation results in a mass of separate rod segments. Special spore formation, in which the spores are supported on stems or aërial hyphæ, also occur. To this class belong the actinomyces or ray fungus and the streptothrix.

---

[1] At a meeting of the Section, held June 10, 1918.

But it is with the saprophytic class that I am dealing. The mould fungus is frequently found in the soil, and it was from this situation that I first noticed the condition, some years ago, when examining some jaws which I removed from the earth in which they lay buried, in the south of Ireland. In these particular specimens there is no very noticeable loss of substance, and it was only on making sections for other purposes that I found how extensively they were destroyed, the growth occupying the interior of the teeth, leaving the surface intact, as will be seen in the figure. Under the microscope a general view of the tooth shows the invasion by the mould fungus. The growth passes in a sweeping direction along the course of the dentinal tubes, swelling and distending them in a manner similar to the pipe-stem appearance of dental caries. In other situations the fungus passes at right angles to the tubes. Tangled strings of mycelium and budding spores are present in isolated patches and in dense continuous masses.

In these specimens of the dentine the organic matrix or tooth cartilage is still sufficiently firm to allow ground sections to be made. It will be seen that the enamel appears dark in colour due to a porous condition, in which the light in passing through is broken up and interrupted, the individual enamel prisms are no longer in close apposition, so as to allow of the light passing through uniformly. The prisms are in fact surrounded by air spaces, due to loss of substance of the margins of the enamel prisms. When highly magnified a fine granular aspect is presented, in strong contrast to the normal translucent appearance. This condition is commonly seen in caries of the enamel, as was pointed out long ago by Dr. Leon Williams.

In some specimens of teeth the dentine shows a very marked contrast; in places it has the normal semitranslucent appearance, but where affected by the mould fungus it has a granular opaque appearance, where the light passing through it is broken up. Where the spore growth is clearly seen there is in the neighbourhood a faint area beyond the growth as though the dentine had been dissolved away by some exudation from the germs. There is a loss of surface enamel in places.

Recently I have received through the kindness of Mr. A. Maggs some remarkable specimens, in which the destruction of the teeth is much more marked. They were sent from Costa Rica by Mr. Orozco-Casorla of San José, who wrote to the effect that the teeth were found in a small earthenware pot of primitive design in an ancient tomb. The Director of the National Museum of Costa Rica says that in such tombs teeth were often found, nearly always with the roots and dentine absorbed, especially in acid earths. Very seldom are teeth found attached to pieces of jaws, and he never knew of pots containing teeth. These tombs are recognized as belonging to the ancient Indian race, which flourished before the time of the Spanish occupation of Central America. The teeth are therefore of considerable antiquity, possibly 500 years old.

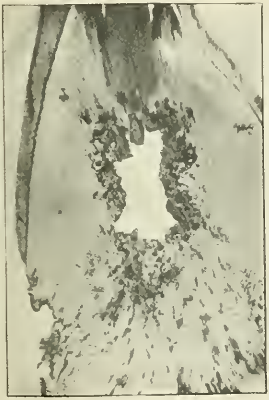


Fig. 1.

Fig. 1 gives a general view of a section of tooth invaded by the mould fungus, entering from the exposed surface of the dentine and also from the neck of the tooth where there is a surface loss of tissue, at the termination of the enamel, and also around the pulp cavity. The growth passes along in a sweeping manner in the direction of the dentinal tubes, but occasionally in isolated patches. The alveolus was similarly affected.

The figures show the extent of destruction of the tissues, some in which nothing but the enamel is left, others in which the enamel also is eaten away to quite half its extent. Invariably the surface of the enamel is the last to disappear, the attack being therefore quicker from the undersurface of the enamel, which in places has become very thin. In one specimen it has been completely perforated. It is curious to note the manner in which the destructive influence has selected the area of dentine beneath the enamel, in some cases leaving a core of dentine in the centre which easily becomes detached.

The interior of these specimens has a deeply furrowed appearance, and undermined cavernous spaces are found when examined with a hand lens. The two lower figures belong to the Irish specimens, and show how slight is the surface loss.

It is quite impossible to decalcify these specimens with acid, either the Irish ones or those from Costa Rica; the whole specimen melts and disappears, and as the dentine is almost as soft and friable as chalk it is very difficult to obtain from the Costa Rica ones even a thin ground section for microscopical examination. In one or two cases where I have succeeded in obtaining small sections the dentine has lost its well-marked appearance of tubes and matrix; they are only faintly outlined. The dentine has a straw colour, and is covered with dark brown patches, which resolve themselves into masses of the mould fungus. The growth, though abundant in these specimens from Costa Rica, differs in character from that found in the specimens from Ireland. The growth is smaller, the large straw-like bands of mycelium so common in the latter are almost absent in the examples from Costa Rica, although in the dust and earth about these specimens it is more abundant. The characteristic appearance of the growth in the

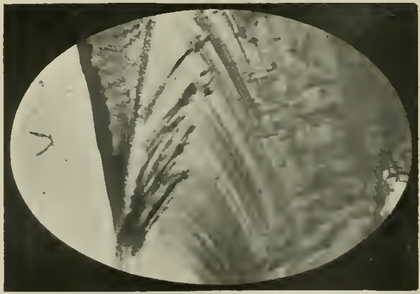


Fig. 2.

Fig. 2 gives the appearance of the growth passing from the neck of the tooth in a transverse direction to the dentinal tubes and beneath the enamel, the under-surface of which is being attacked by the fungus. The enamel has become dark and slightly porous.

dentine under a low magnification is somewhat that of a cluster of grapes, rounded spores on short stalks. Here and there one may see them quite distinctly under a magnification of 300 diameters.

As I mentioned, the suggestion is made that these teeth are especially found destroyed in an acid soil, but to my mind the appearances do not resemble those of teeth acted upon directly by an acid. It may favour the growth of the mould fungus, and there are indications in some of the Irish specimens of the presence of red oxide of iron, but as the rock formation was a coral limestone, the only acid likely to be present would be carbonic acid in solution; this would dissolve any iron, but would not dissolve the phosphate of lime present in the teeth. I feel sure, therefore, the destruction is due to the action of the germs so abundant in the earth surrounding these teeth, and so intimately present in the substance of these teeth. It is remarkable that nowhere is bone found along with these teeth from Costa Rica, and it suggests that the destruction by the fungus is quicker in bone than in tooth structure. The extreme porosity of the bone in the Irish

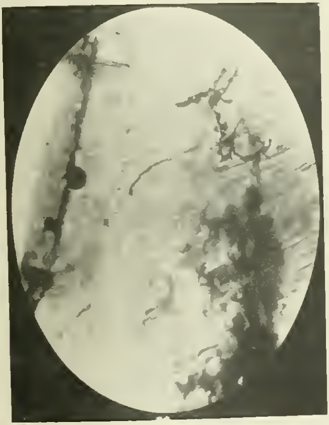


Fig. 3.

The margin of a dense patch of fungus. The characteristic appearance of the advancing growth, the tangled strings of mycelium and budding spores which dot the surface.

specimens, together with the abundant presence of the germs, agrees with this idea.

The two groups which I have shown are found in different parts of the world and subject to different conditions, in the one case lying

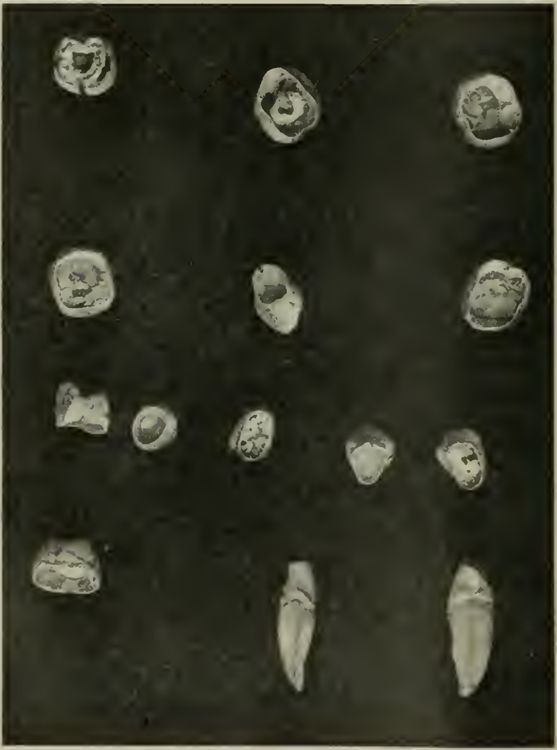


FIG. 4.

Teeth in various stages of destruction due to mould fungus, from a tomb in Costa Rica. The two lower figures are from the Irish specimens; from their apparently normal appearance the actual condition may easily be overlooked. On section, they show the same destructive appearance of the interior as in fig. 1 and fig. 2.

buried in the earth, in the other removed from actual contact by means of the earthenware pot and therefore more surrounded by air than earth. They represent almost the extreme limit of destruction, beyond which the teeth would be unrecognizable.

I have endeavoured to find indications of this condition in its earlier stage and for this purpose have examined some jaws and teeth stored away in boxes. It is quite easy to find threads and web-like masses in protected places about the teeth and bones such as is here shown. In two teeth which were placed in a glass bottle seven years ago there is present such a growth, sometimes appearing as horsehair threads, sometimes as straw-coloured filaments, or wool-like masses. Often there is not the matured development of the mycelial filaments, but a finer growth. A thin section of the tooth was prepared and showed the dentine with its normal lustre and appearance, but in the cement, and sometimes in the dentine, collections of rod-shaped and bud-like spores were present, such as is shown in the figure. I think with experience it would be possible to produce a more rapid growth of the fungus and with a suitable stain, which is difficult to find, an earlier indication of the growth obtained.

If we consider the vast collection of bones and teeth of man and animals which would accumulate below the surface of the earth throughout the ages, one must admit that the mould fungus plays an important part in the economy of nature by this work of destruction and it is remarkable that it does so by acting directly on the teeth and not as in dental caries where the bacteria are assisted by the chemical changes in the food.

Mr. H. MUMMERY: The special interest of these specimens of Mr. Bennett's lies in the very extensive destruction of the dentine by the micro-organism. Professor Miller described the boring of the dentine by a micro-organism in 1882. This was in a piece of dentine which had been a long time in water. He also found the same condition in two natural teeth which had been used as pivots. He identified the organism as the *Saccharomyces mycoderma*, and considered the penetration was due to an acid formed by the organism, but later considered this was uncertain. Galippe described similar cases in long-buried teeth and Mr. C. Tomes in 1892 described this penetration of the dentine and cementum by a fungus in some teeth taken from a graveyard. It is very common to find it in prehistoric teeth, and I have several such specimens, but in all these cases the organism appears to be a budding fungus as described by Miller. The specimens shown by Mr. Bennett appear to be penetrated by a streptothrix. In some examples of teeth from the stone-age

—given to me in Scotland—I found, the enamel was traversed by grooves passing in different directions. This action on the enamel does not appear to be caused by a fungus and I suggest it may be due to a superficial decalcification by carbonic acid in water in the neighbourhood of roots of plants around the teeth—the percolation of the water during a long period following the channels formed in the enamel and gradually deepening them.

Tooth impacted in a Secondary Bronchus of the Left Lung; Removal by Tracheotomy and Lower Bronchoscopy after Two Unsuccessful Attempts by Upper Bronchoscopy.[1]

By Sir StClair Thomson, M.D.

History of Accident.

On November 20, 1917, a healthy girl, aged 10, of a nervous type, was placed under nitrous oxide anæsthesia for the purpose of removing the two first lower (temporary) molars. The left one was first extracted; the dental surgeon drew it outside the mouth in his forceps and then shook it loose with the intention of throwing it into the usual porringer beside the dental chair. But he noticed, instead, that the tooth fell on to the napkin, tucked under the child's chin, and was caught there in a fold. Without delay he then proceeded to the extraction of the corresponding tooth on the right side; as he turned and threw this away the child, recovering from the anæsthetic, raised both hands (with the napkin above them) towards her mouth, making at the same time a deep inspiratory gasp. The dentist never suspected that at this moment the first tooth must have re-entered the patient's mouth.

When the child recovered from the gas it was remarked that she was slightly wheezy. A few days later, Dr. Smallwood, of Little Waltham, Chelmsford, was called in and found a catarrhal condition with very little air entering the left lung. Wheezing continued, and, in view of a marked family history, it was treated as possible asthma. Some relief was obtained, but no cure.

In view of the one-sided symptoms, Dr. Smallwood made further inquiry, and, on tracing the illness back to the period of the tooth-extraction, he shrewdly suspected that there might be a foreign body in the lung. A consultation with Dr. G. F. Still confirmed him in this hypothesis. There was then, a month after the visit to the dentist, a slight wheezing which was audible at a distance of a foot or two from the chest. Rhonchi were heard on both sides, but chiefly over the left lung, with absence of air entry towards the posterior border of the left axilla. There was a short cough.

---

[1] At a meeting of the Section, held June 10, 1918.

An X-ray examination by Dr. Ironside Bruce showed the tooth in the depths of the left lung.

FIRST EXAMINATION.

On December 28, 1917, I started to attempt removal by direct bronchoscopy through the mouth. Bromide was given for three days beforehand to diminish reflex. Chloroform was administered by Mr. Bellamy Gardner, and I was assisted by Dr. Irwin Moore.

I found the build of the patient showed narrow and long air passages, allowing only the use of a Brünings' 7-mm. tube. Reflex cough was diminished, as I passed the tube down the trachea, by the application of cocaine to the larynx and to the carina—which is the next most sensitive spot. I had to be moderate in the use of cocaine (a 2½ per cent. solution) owing to the age of the patient. After much searching the white glistening tooth was seen, tightly impacted in an externo-lateral, secondary branch of the left bronchus, at a depth of 10½ in. from the teeth. All my efforts to grasp it with various instruments failed. The narrowness of the bronchiole prevented a wide opening of any nippers, and the polished, smooth, ivory surface of the tooth gave no hold. I then made use of a long probe with a bent hook at the end, and insinuated it between the tooth and the bronchial wall, with the hope of either extracting the tooth or turning it round. The hook was passed beyond the tooth, but all efforts to extract the tooth failed; what was worse, the hook appeared to catch in some other bifurcation close behind the tooth, and I found that I could neither extract the tooth nor the hook. I had forgotten Chevalier Jackson's warning that "hooks with a curve greater than a right angle are very apt to become engaged in small orifices and to be very difficult in removal."[1] After some anxious five or ten minutes I succeeded in disengaging the hook with only slight traumatism.

---

[1] "Per-oral Endoscopy and Laryngeal Surgery," p. 272.

The tooth remained in position.

The patient had now been under chloroform for one hour forty-five minutes so I decided to abandon the attempt that day.

SECOND EXAMINATION.

Eight days later, on January 5, 1918, chloroform was again given. There was much more reflex cough and secretion of mucus this time; the tooth was discovered more deeply, and less of it was visible, owing to swelling of the mucosa. I found it very difficult to keep the tooth well in view in the centre of the field of vision, owing to the strong traction towards the patient's right side which I had to maintain on the handle of the instrument, in order to direct the beak of it well towards the left axilla. I was about to introduce Dr. Irwin Moore's non-slip forceps when—doubtless owing to the aforesaid traction dragging on the root of the lung or on the heart—the patient suddenly collapsed, and had to be restored by artificial respiration. She had been under the anæsthetic forty minutes. There was no shock nor feverish reaction from this examination, but after these two ordeals I thought it best to let the child go to the country—which she did five days later.

ALTERNATIVES.

Foreign bodies have been coughed up many a time in days gone by, sometimes after a prolonged stay in the chest. But, unfortunately, statistics do not help us in this, as we never know in what part of the air tract the intruder had been sojourning, nor how firmly it had been fixed. A large, light foreign body, mobile in the trachea or a main bronchus, may easily be coughed up; but there is little chance of such a happy expulsion with a small, solid, smooth substance tightly impacted in a secondary bronchus and with all the air on the far side of it absorbed. On the contrary, each deep breath—preliminary to an explosive cough—would only tend to wedge it deeper.

There was the alternative of the tooth becoming loosened by suppuration taking place around it—almost certain to happen in time—and its being expelled by the mouth with the discharge of the abscess. But, unfortunately, even with such a development there was no certainty that the pus would remain localized and burst towards the main bronchus, nor that it would bring the tooth with it. The pus might just as readily diffuse in the lung and cause sepsis.

I considered the possibility of thoracotomy. The results of this operation are not brilliant. Considerable progress has been made during the war in removing through the ribs fragments of shells and other missiles which have entered the lungs. But there is a great difference in following the track of a foreign body which has penetrated into the lung through the chest wall, and hunting around from the outside of the thorax for a foreign body which has entered from the glottis and lies at the root of the lung, close behind the pericardium.

LUNG ABSCESS DEVELOPS.

Action, however, had soon to be decided on, owing to developments in the case. Dr. Smallwood reported that there was no wheezing and only occasional slight shortness of breath. There was slight deficiency of air entry in the left axilla rather toward the posterior fold. The heart's apex was about $\frac{3}{4}$ in. outside the nipple, probably due to collapse of a portion of the lung and the heart swinging over to take its place. She had continued to eat and sleep well, in spite of the tooth in the lung, and the temperature was normal. But it soon began to rise until it was oscillating from 97° F. every morning to 101° F., 102° F., and 103° F. in the evening. An X-ray by Dr. Ironside Bruce showed the tooth as before, or even deeper, with commencing opacity in the left lung. Abscess formation had evidently taken place and action could not be delayed.

Dr. Dundas Grant and Mr. E. D. D. Davis, whom I called in consultation, were unanimous in strongly recommending that there should be no further attempt at removal by upper bronchoscopy (i.e., through the mouth); that there was no objection to tracheotomy except the slight scar, which I had wished to avoid in a young lady; that tracheotomy would enormously facilitate extraction, and that, in the event of failure to extract the tooth, the patient would be much safer with a tracheotomy tube in her neck if we should be compelled to await a later chance of spontaneous expulsion.

I readily agreed to this after the experiences I have related and also because I had already fulfilled one of Chevalier Jackson's rules, which is as follows: "If the first bronchoscopy is not successful after fifteen or twenty minutes in a child, it is better to desist, wait a few days and repeat the oral bronchoscopy at least twice before resorting to the tracheotomic route" (p. 252).

THIRD EXAMINATION AND SUCCESSFUL REMOVAL.

Next morning, January 26, 1918, chloroform was administered by Mr. Bellamy Gardner. I had given bromide for three days beforehand. Again I was assisted by Dr. Irwin Moore and also by Dr. Dundas Grant and Mr. E. D. D. Davis. The trachea was quickly exposed without having to tie a single vessel. I injected a 2½ per cent. solution of cocaine, with a little adrenalin, into the lumen of the trachea by stabbing between the rings with a hypodermic needle. This abolished any cough on opening the trachea. Through the tracheotomy wound I was able to pass the outer, 9 mm., Brünings' tube, instead of the narrow inner 7 mm., which was all I had been able to introduce from the glottis. I came readily down on the tooth at a distance of less than 5½ in., instead of the 10½ in. to 11½ in. interval by which I was separated from it in the two previous examinations. Any approach of the instrument to the tooth caused reflex, barking cough. Some little time was spent therefore in cocainizing the region. As this was being done some milky fluid kept oozing upward alongside the tooth. Finally, when a swab produced no reflex on touching the tooth, I took a pair of Killian's "bean forceps" down to the tooth and then dilated them so as to free the tooth and get a good grasp. This must have released the pus pent up behind the tooth, for there was a gush of yellow fluid and for the moment I thought I would be baulked in removal. But, knowing I was in a good position, I carefully closed and withdrew the forceps and found the tooth firmly grasped in the middle of them. One or two teaspoonfuls of yellow pus welled into the left bronchus and were cautiously sponged out, while the head and thorax were lowered in the Trendelenburg position. I left the bronchiole clean with only a minute granulation in it.

From the beginning of the tracheotomy to the removal of the tooth, the time occupied was exactly twenty-nine minutes. There was no shock or collapse.

COMPLETE RECOVERY.

The after-history was uneventful. In an effort to avoid all scarring I closed the entire wound in the neck with buried catgut and superficial silkworm and horsehair sutures, but the two or three middle sutures had to be cut away as there was some cough leading to subcutaneous emphysema which extended right up to the eyes. One month afterwards the patient went to the seaside and Dr. Smallwood wrote to me as follows: "She seems very fit and the chest is clear as far as I could make out, except a little deficiency of air entry in the left lower lobe." The scar in the neck is insignificant.

BIBLIOGRAPHY.

I had not intended attempting a study of the records of the falls of teeth into the lower air-passages, but, by pure accident, I came across a communication which is very interesting when compared with my own, both from the points of diagnosis, method of treatment and after-result. In 1908, Mr. Rutherford Morison read "Notes of a Case in which a Portion of a Lung was Excised" before the Medical Society.[1] This was the case of a woman aged 36 to whom chloroform was administered while six to eight stumps were extracted. On recovery she found one tooth lying loose, between the cheek and gum, and spat it out, and, at the same time, felt difficulty of breathing and a tightness in her chest, and expressed her own conviction that a "stump had gone down her throat." Three weeks later a long illness started with cough, blood-spitting, profuse and fœtid expectoration, and loss of weight and strength. This went on for two years before the diagnosis was made, of bronchiectasis limited to the lower part of the left lung caused by "a tooth impacted in a bronchus," although "Röntgen-ray examination showed no abnormal shadow." Operation from the outside was attempted by resecting 6 in. of the eighth rib. A large portion of the lower lobe of the lung was removed, but the patient died twenty-eight days later from pericarditis. The post-mortem showed that the tooth stump was impacted in a secondary bronchus, and that it had only been missed at the operation by $\frac{3}{4}$ in.

At the ensuing debate, Dr. J. Kingston Fowler referred to a case of a tooth in exactly the same position—a cavity formed in the lung. Operation from the outside failed and the patient ultimately died from pulmonary tuberculosis.

A. Barker narrated a case of a tooth in a right bronchus, leading to gangrene and an empyema. It was decided to attempt removal through the chest wall, but "the first few whiffs of chloroform proved fatal."

The fact that three separate personal cases of a tooth in the lung could be recorded at a meeting of a general medical society would appear to indicate that the accident may not be so rare as one might think. That X-ray examination should have failed to detect the tooth shows how far radiology has progressed in these eight years, and that endoscopy should not have been employed in Mr. Morison's case demonstrates how slowly the knowledge spreads in the profession of the recent rapid progress of laryngology. The case also warns us not to disregard a patient's own feelings when he says that he feels something has stuck in the throat or chest.

---

[1] *Trans. Med. Soc. Lond.*, 1908, xxxii, p. 6.

A recent discussion in America shows that bronchoscopic cases of dental origin are by no means uncommon.[1] Indeed, one speaker suggested the necessity of a detailed method of observation and counting in the extraction of teeth, similar to that provided by the abdominal surgeon in cases of sponges and instruments. This would hardly cover the ground, for in the above debate the following articles of a dentist's armamentarium were mentioned as having been retrieved from the lungs—teeth, gold crowns, bridges, dental burrs, pieces of rubber and fragments of plaster of Paris models.

PRECAUTIONARY TREATMENT IN SIMILAR CASES.

What line of action should a dental surgeon follow if he thinks, or even suspects, that a tooth or other foreign body had entered the air passages while his patient is in the chair? Well, the first and most important indication is given us in the good old medical principle "primum non nocere." Chevalier Jackson has tabulated the following seven "don'ts":—

(1) Do not reach for the foreign body with the finger, lest the foreign body be thereby pushed into the larynx, or the larynx be thus traumatized.

(2) Do not make any attempt at removal with the patient in any other position than recumbent, with the head and shoulders lower than the body.

(3) Do not hold up the patient by the heels, lest the foreign body be dislodged and asphyxiate the patient by becoming jammed in the glottis.

(4) Do not fail to have a radiograph made, if possible, whether the foreign body in question is of the kind dense to the ray or not.

(5) Do not fail endoscopically to search for a foreign body in all cases of doubt.

(6) Do not pass an œsophageal bougie, probang, or other instrument blindly.

(7) Do not tell the patient he has no foreign body until after a radiography, physical examination, indirect examination, and endoscopy have all proven negative (op. cit., p. 235).

Several of the above precautionary measures are advised so as to prevent gravitation attracting the foreign body, particularly if of small size, into a deeper secondary bronchus. It is better, if possible, for the patient to rest until he can be treated, lying flat and face downwards. In this position there is less likelihood of the foreign body falling into the middle or upper lobe secondary bronchi—regions where it is particularly inaccessible—and it is into these undesirable tubes that it might gravitate if the patient lay on his back or on one side. The patient should not be encouraged to cough or hawk up. The chances of success are small if the foreign body has passed the glottis, and the efforts may only drive the point of a sharp substance, like a pin or tack, deeply into the mucosa. In the case of a loose or larger body, the cough may drive it up into the glottis and so threaten asphyxia. If one felt certain that the tooth or other foreign body was in the œsophagus, these rules would not apply, but, short of that, it is wiser to follow them as nearly as possible until the case can be placed in the hands of a skilled laryngologist.

---

[1] B. R. Shurly and others, *Trans. Amer. Laryngol. Assoc.*, Thirty-ninth Meeting, 1917, p. 102.

A MEDICO-LEGAL ISSUE.

That similar cases may be fraught with unpleasant legal consequences is shown by a paragraph in the *British Medical Journal*, December 7, 1912, p. 1646. It is therein recorded that a Glasgow dentist was sued for £1,500 damages. The pursuer alleged that in February, 1908, the defender allowed a portion of a tooth to fall down the pursuer's throat into his right lung, while several back and front teeth were being extracted under chloroform. Three years later, during a paroxysm of coughing, the patient coughed up the tooth. The dentist was charged with having, "negligently and in violation of his duty," failed to account for all the teeth extracted, and omitted afterwards to suggest the possibility of a tooth in the lung, although seeing the pursuer frequently afterwards. Fault was denied by the defender. At the trial, in March, 1912, a jury under Lord Ormidale, returned a unanimous verdict for the pursuer, and assessed the damages at £750.[1] The defender appealed for a new trial on the grounds that the verdict was contrary to evidence and that the damages were excessive. The report in the *British Medical Journal* concludes as follows: "The Division of the Court of Session (Lord Johnston dissenting) refused the application for a new trial. Lord Johnston was satisfied that the defender had suffered an injustice, and that the verdict was not only a bad one, but that it was given in circumstances which called for a new trial, and he thought he was bound in fairness to the defender to say so."

I entirely agree with Lord Johnston and I cannot imagine how any jury could give a verdict against a dentist after a similar accident, unless it were proved that he neglected to use reasonable care. The accident might be caused by sudden movements of the patient—as in my case. Even when the patient is under a general anæsthetic his unconscious movements, and the consequent inspiration of the tooth, might be fairly attributed in some cases to his previous alcoholic excesses and not to the dentist's clumsiness. Or, again, might not inefficient administration of the nitrous oxide gas be the chief cause, and the anæsthetist be held responsible?

---

[1] *Glasgow Herald*, March 15, 1912.

RESULTS OF BRONCHOSCOPY.

Let me conclude by recalling what endoscopy has done for the benefit of humanity. In former times a certain number of foreign bodies, loose in the larynx or trachea, were coughed up sooner or later. Still, statistics in pre-bronchoscopic days show a death-rate of 52 per cent. The early years of bronchoscopy—i.e., up to 1908, reduced the mortality to 13·1 per cent. (von Eicken). In 1909 and 1910 this was further reduced to 9·6 per cent. (Kahler). By 1913 the death-rate of various surgeons in the United States had fallen to 5·3 per cent., and Chevalier Jackson's own practice in his last 182 consecutive cases of bronchoscopy for foreign bodies gives a total of three deaths (1·7 per cent.) (p. 246, op. cit.).

Deaths that do occur are less attributable to bronchoscopy than to the results of the sojourn of the foreign body or to blind efforts at removal.

NEED OF EXPERT HANDLING.

But these favourable results can only be secured by experienced hands. Fletcher Ingals says he has seen numerous cases of fatal results from bronchoscopy and he believes that "the fatalities with inexperienced people would run between 10 and 20 per cent. if all cases could be collected." The same writer appreciates the strain put on us by such cases. He writes: "The heart-breaking delays, the extreme anxiety for the patient, and the knowledge that prolonged operations of the kind are dangerous, while failure may spell death for the patient, place the operator under such circumstances under an indescribable stress." No wonder Chevalier Jackson says: "There is absolutely nothing like it in the whole realm of surgery."[1]

DISCUSSION.

Dr. IRWIN MOORE: A study of the reported cases shows that owing to the great skill and care of dental surgeons the accidental aspiration of teeth into the air passages during extraction is exceedingly rare, and is nothing like so common as the aspiration of other foreign bodies under different circumstances. Sir StClair Thomson has referred to some general statistics of foreign bodies in the air passages. I will now give you some statistics relating only to teeth in the respiratory passages, nearly all the cases having occurred during extraction.

---

[1] This case is recorded a little more fully, and with several illustrations, in *The Practitioner* for August, 1918.

False teeth are usually too large to pass the vocal cords, and though we are not concerned to-day with the question of dentures, I would like to mention a few very interesting cases.

Wild[1] reports a case in which a plate with two false teeth entered the left bronchus. It was successfully removed eleven days after the accident by tracheotomic bronchoscopy.

Carpenter[2] records a case in which a set of four false teeth, made of one piece of ivory on a silver clamp, had been drawn into the air passages. Thirteen years afterwards the patient died after an attack of acute pleurisy. The right pleural cavity contained 5 pints of sero-purulent fluid, and in it were found the artificial teeth. A fistulous opening was observed on the surface of the lung, through which it was supposed the teeth had passed.

Major[3] refers to a case where a plate was aspirated, and was subsequently seen by laryngoscopic examination lying on the bifurcation of the trachea. The morning after the accident the patient was quite unconscious of what had happened. A cough with dyspnœic symptoms subsequently developed, together with evidence of a localized pneumonia. The denture was successfully removed by tracheotomy, having been in position for four months.

Statistics of Teeth aspirated into the Air Passages.—Hoffmann[4] (Leipzig) in 1897 tabulated 160 cases of foreign bodies aspirated into the lungs during the pre-bronchoscopic days. Amongst these there were only twelve teeth and two dental plates. Hodge,[5] in 1903, added to this list a further ninety-two cases, amongst which were five cases of teeth. Claytor[6] (Washington), in 1906, tabulated fifty cases, and refers to only one tooth case. Chevalier Jackson[7] (Pittsburg) in 1914, since the introduction of bronchoscopy, gives the statistics of Clarke and Marine,[8] who found that amongst thirty-one cases of foreign bodies aspirated into the lungs a tooth was present only twice. Chevalier Jackson,[9] amongst sixty tabulated cases in his latest work, "Per-oral Endoscopy," reports only two cases. I have collected from the literature the reports of forty-six cases, of which forty occurred during the pre-bronchoscopic days, whilst only six have occurred since bronchoscopy was introduced in 1904. Of the forty cases reported during the pre-bronchoscopic days, nineteen were coughed up and the patient recovered; seventeen died; whilst four recovered after operation (three following tracheotomy and one after thoracotomy). In eight out of the total forty-six cases it was reported that the tooth was in the left bronchus or its divisions; of these five were coughed up and the patient recovered, whilst three died. In fifteen of the total cases the tooth was in the right bronchus; of these three were coughed up and the patient recovered; seven died. Tracheotomy was performed in one case with recovery, and per-oral bronchoscopy in four cases with success. Since the introduction of bronchoscopy I can find only six cases reported; of these five were impacted in the right bronchus or its divisions, and one in the left bronchus. Of the five in the right bronchus, one was coughed up, and four removed by per-oral bronchoscopy, whilst the one in the left bronchus was coughed up. These statistics show that a case such as the one reported to-day is uncommonly rare. In the case of the eighteen who died during the pre-bronchoscopic period, death occurred in a few hours up to thirteen months. There were no deaths amongst the four cases treated by per-oral bronchoscopy since 1904, but one of these died ten days later from typhoid fever (Chevalier Jackson). So far as the expectant treatment is concerned, and the chances of recovery by spontaneous expulsion, we have seen that out of forty-six cases twenty-one were coughed up and the patient recovered. This occurred either directly on coming round from the anæsthetic, within a few hours, up to two years and seven months. In the latter case, however, the patient died a year later from pulmonary disease, caused by the sojourn of the foreign body. Arthur Durham[1] showed that out of 271 cases of foreign bodies in the respiratory passages, during the pre-bronchoscopic days, and not operated on, 156 recovered (57·5 per cent.) and 115 died (42·5 per cent.). The 156 recoveries were due to the voluntary expulsion of the foreign body, ranging from the first day to seventeen years. Of 435 cases treated by operation, chiefly tracheotomy, 328 recovered (75·4 per cent.) and 107 died (24·6 per cent.). Killian,[2] amongst 164 reported cases of foreign bodies in the respiratory tract since the introduction of bronchoscopy, found that only eight were coughed up. Fletcher Ingals[3] (Chicago) says some organic substance will be coughed up, but 90 to 95 per cent. of the patients with foreign bodies in the lungs will die within three or four years unless the foreign body is removed. We may safely accept this as a correct estimate of the risk to life of a foreign body in the lungs.

---

[1] Quoted by Ballenger, "Diseases of the Nose, Throat and Ear," 1908, p. 556.

[2] *Guy's Hosp. Repts.*, 1st ser., 1842, vii, p. 353; cited by Durham in "Holmes' Surgery," 1883, i, p. 764; cited by Gross, "Treatise on Foreign Bodies in the Air-passages," Philad., 1854, p. 450.

[3] *Archives of Laryngol.*, New York, 1882, p. 232; cited by Bosworth, "Diseases of Nose and Throat," New York, 1892, p. 698.

[4] "Specielle Pathologie und Therapie," 1897; "Nothnagel's Encyclopædia of Practical Medicine" (Eng. ed.). 1903, p. 37.

[5] Op. cit., pp. 59-69.

[6] "Foreign Bodies in the Bronchi," *Amer. Med.*, 1906, xi, p. 395.

[7] Reference No. 85, *see* Bibliography, "Per-oral Endoscopy," 1915, p. 678.

[8] *Trans. Amer. Laryngol. Assoc.*, 1914, p. 53.

[9] "Per-oral Endoscopy," 1915, pp. 399-400.

I have recently designed a pair of forceps for the removal of foreign bodies from the lungs which are admirably adapted for dealing with an impacted tooth in a bronchus, and removing it satisfactorily by means of upper bronchoscopy. These forceps are modelled on the principle of the approximation of two aural spuds or curettes. The blades are serrated transversely and have at their extremities small teeth, two on the lower and one on the upper blades, which are not sharp enough to catch up or injure the lung, but are sufficient to prevent the forceps from slipping off the foreign body. Cubical or round bodies—e.g., glass beads, fruit stones, irregular foreign bodies such as beans, oval seeds, or partially disintegrated bodies—which experience has shown are the most difficult to seize, may be securely grasped and safely removed by means of these forceps, without crushing. It is impossible for the forceps to break as has so often been found in the case of the bean forceps of Killian and Brünings. Having located the foreign body in a bronchus—e.g., an impacted tooth—the forceps are passed beyond the extremity of the endoscopic tube and inserted between the tooth and bronchial wall. The first step is to dilate the bronchial wall above the tooth by slightly loosening the control of the hand on the handle spring, which allows the forcep blades to forcibly expand; the forceps are then pushed gently downwards about 1·5 cm. when the blades may be closed with the absolute assurance of grasping the tooth in such a position round the neck that they will not slip off. The procedure is somewhat similar to a dental extraction.

---

[1] Quoted by Bosworth, "Diseases of Nose and Throat" (Amer. ed.), 1902, ii, p. 702.

[2] *Trans. XVIIth Internat. Cong. Med.*, Lond., 1913 (Sect. Laryng.), p. 3.

[3] Discussion on Chevalier Jackson's paper, "Limitations of Bronchoscopy," *Trans. Amer. Laryng. Assoc.*, 1914, p. 63.

Mr. BELLAMY GARDNER: The cause of the patient's collapse at the second operation was mechanical pressure upon the heart from behind by the tube of the bronchoscope at a particular moment; this was intensified by obstruction of air entry into the right lung owing to the absence of air holes of sufficient size throughout its length. The choroform vapour administered was warmed in a metal Junker's bottle inserted in the waistcoat pocket and worked with a foot bellows. The child was strong and healthy and was very resistant to the effects of anæsthetics.

Mr. WILLIAM HERN: One important point for dental surgeons is how to prevent such accidents. Although the accident in this case did not occur from the slipping of a tooth out of the grasp of the forceps, yet this is perhaps one of the most likely to occur. The conical form of the roots of certain teeth makes them especially prone to slip out of the grasp of the forceps, notably the lower bicuspids, and certain temporary teeth with little or no root length. The placing of a small napkin at the back of the mouth when extracting is a great safeguard against an accident with a slipped tooth. I hold that there is one thing more important than the counting of the roots extracted, and that is for the operator to make sure that each and every root extracted is promptly removed from the mouth and placed in such a position as not to return to it, before the extraction of another is attempted.

Sir STCLAIR THOMSON (in reply): The immediate treatment for a tooth which is wandering in the upper air or food passages depends entirely on its situation. If lying in the pharynx, or above the glottis, it may be hooked up with the forefinger or expelled by a cough. If it has passed into the gullet, it should be left for attention later on. If it appears to be in the glottis or below, the dental chair will prove a most valuable instrument as it can easily be tilted so as to put the patient on his back, on a slope, with the head lowermost. I would urge the importance of accounting for all stumps when several are extracted at one sitting.

Case of Rheumatoid Arthritis treated by Ionization of Periodontal Membrane.[1]

By Ernest Sturridge, L.D.S.Eng., D.D.S.N.Y.

In bringing to your notice this particular case, it is not so much with the desire of emphasizing the fact that rheumatoid arthritis is often caused by pyorrhœa—that has been conclusively proved—but to draw attention to two important points which appear to be insufficiently recognized.

In the first place we should have expected to find considerable oral sepsis of long standing to account for the severe and advanced state of rheumatoid arthritis in the case I am about to cite, but this is by no means necessary—very little visible sepsis is sufficient to produce such a condition. Again, the frequency with which cases are referred to me after having undergone long courses of treatment by vaccine therapy *alone*, without attention to local surgical treatment for pyorrhœa or with only imperfect local treatment, leads me to conclude that a large number of medical men do not realize that pyorrhœa is a purely local disease which must be treated locally, and that no amount of vaccines or any other treatment will bring about a cure unless the local irritant cause is removed.

The patient, Mr. B., aged about 45, consulted me on June 28, 1917. He was unable to walk, and could only move about with assistance and with the aid of crutches; his knee-joints were very much bent and perfectly rigid. He had been in that condition for a considerable time (how long I did not ascertain), and informed me that the doctors in attendance attributed his arthritis to septic absorption, the only source of which was his mouth, and that there was a question as to the advisability of extracting all his teeth, which were perfectly sound and not loose. He had been treated for pyorrhœa by vaccine therapy, the predominating organism being the streptococcus from which the vaccine was prepared; but this seems to have had very little effect on his arthritis, although the state of his gums seemed to have made improvement. His teeth were perfectly clean as far as the gingival border, the gums looked fairly healthy, there being only a fringe of redness about the lower incisors and a purple hue about the lingual surfaces of the molars. The patient worried over his condition a good deal; he brushed his teeth several times a day and used peroxide of hydrogen freely. There was no visible pus anywhere, and if this constitutes a cure of pyorrhœa by vaccine therapy, a cure might be claimed here, and I suppose this is the appearance of the mouth when cures are claimed under similar conditions.

---

[1] Casual communication, presented July 8, 1918.

But examination of the gingival trough revealed the true state of things: there was a hard brown crust of ceruminal calculus encircling the roots of the teeth, from which the periodontal membrane had receded, forming shallow pockets. These pockets were singularly free from food débris. The irritant here was the calculus, which was quite out of sight, and had kept the gingival fold and periodontal membrane in a state of inflammation, as was evident from the bleeding which occurred when an instrument was passed into the trough. Tissues in this condition readily become infected, the toxins passing into the system through the bony channel, and it is by no means essential that pus should be present.

In my opinion the toxæmia had never been eliminated at the source; the infection at the alveolar border had kept up a constant supply of streptococci unaffected by the vaccine. Although the clinical appearance of the gingiva appeared to indicate a great improvement after six months of treatment, there being no pyorrhœa in the true sense of the term, still the patient was making no progress.

The treatment carried out consisted in removing every particle of calculus and polishing the root surfaces; this was no easy matter on account of the hardness and tenacity of the deposit. At each sitting ionization of the gingival trough and alveolus was carried out with zinc ions, the patient being a good electrical subject, a current of 5 to 10 ma. was tolerated and the tissues yielded immediately to the treatment.

On August 10 he was discharged, every sign of inflammation in the gingival trough having disappeared. Three months later the pockets were examined and found to be in the same healthy condition. A decided improvement had taken place in the rheumatoid affection: the patient could walk across the room without crutches; although his knees were still bent and stiff, he nevertheless expressed his conviction that he was progressing favourably.

On June 10, 1918, when he was last seen (that is, ten months after treatment) the gingival trough was perfectly healthy, he had long since discarded the use of crutches, his knees were almost normal in shape, only a slight stiffness remaining; he was able to walk long distances and had resumed his occupation as an engineer.

He had had no other treatment since his course of ionization; had simply kept his teeth clean, using a benzoic acid and thymol wash on the brush twice daily. There can be no doubt that the rheumatoid arthritis was caused by this apparently slight septic inflammation of the gingival trough and a cure was effected by removing the local irritant cause and at the same time sterilizing the affected tissues by zinc ionization—both being necessary, in my opinion.

I am convinced that vaccines are useless when local irritants are left in contact with the affected area in pyorrhœa cases; the inflammation will never completely subside and toxins continue to be absorbed through the bony channel, where resistance is practically *nil*.

This case is typical of many which have come under my notice where constitutional disturbances of various kinds have been caused by infection of the gingiva and I cannot recall a single instance of recurrence of the systemic disorder when reasonable care has been taken by the patient to carry out proper hygiene of the mouth. I have not yet come across a case in which the necessity for wholesale extraction of teeth has been apparent.

The following communications have also been made before the Section.

DEMONSTRATION:

Lieutenant JOHNSTON, R.A.M.C.: "The Technique employed in the Radiography of Injuries of the Lower Jaw, at the Queen's Hospital, Sidcup." February 18, 1918.

PAPERS:

NATHAN MUTCH, M.D.: "Infections of the Mouth in their Relationship to those of the Intestinal Tract." May 6, 1918.

F. N. DOUBLEDAY: "Local Anæsthesia in Dental Operations." July 8, 1918.

The above two papers will shortly appear in the *Proceedings*.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY

J. Y. W. MacALISTER

UNDER THE DIRECTION OF

THE EDITORIAL COMMITTEE

VOLUME THE ELEVENTH

SESSION 1917-18

SECTION OF OPHTHALMOLOGY

1805 1834

1907

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1918

Section of Ophthalmology.

OFFICERS FOR THE SESSION 1917-18.

President—

William Lang, F.R.C.S.

Vice-Presidents—

William T. Holmes Spicer, F.R.C.S.
George Mackay, M.D.
A. Hill Griffith, M.D.
Priestley Smith, F.R.C.S.
A. MacGillivray, M.D.
Charles Higgens, F.R.C.S.
H. E. Juler, F.R.C.S.

Hon. Secretaries—

Arthur W. Ormond, F.R.C.S.
Leslie Paton, F.R.C.S.

Other Members of Council—

P. C. Bardsley, M.B.
Rayner D. Batten, M.D.
Thomas H. Bickerton.
Elmore W. Brewerton, F.R.C.S.
L. V. Cargill, F.R.C.S.
E. Treacher Collins, F.R.C.S.
F. Richardson Cross, F.R.C.S.
R. H. Elliot, M.D.
Wilfred Harris, M.D.
C. O. Hawthorne, M.D.
Gordon Holmes, M.D.
J. B. Lawford, F.R.C.S.
Arnold Lawson, F.R.C.S.
R. Foster Moore, F.R.C.S.
W. C. Rockliffe, M.D.
J. B. Story, F.R.C.S.I.
F. G. Thomas, M.B.

Representative on Library Committee—

J. Herbert Parsons, F.R.C.S.

Representative on Editorial Committee—

Arthur W. Ormond, F.R.C.S.

SECTION OF OPHTHALMOLOGY.

CONTENTS.

February 6, 1918.

R. H. Elliot, Lieutenant-Colonel I.M.S. PAGE

Changes in the Vitreous resulting from Penetrating Septic Wounds (Abstract) 1

A. W. Ormond, F.R.C.S.

Note on the Direct Observation of the Fundus Oculi during a Period of Temporary Blindness (Abstract) 5

June 12, 1918.

F. A. C. Tyrrell, F.R.C.S.

Case of Mooren's Ulcer 7

Malcolm L. Hepburn, M.D.

Old Choroidal Scar with Fibrous Band stretching from it to the Disk ... 8

G. Harvey Goldsmith, M.D.

Coloboma of Optic Disk and Choroid 10

A. B. Roxburgh, F.R.C.S.

Implantation Cyst in a Girl, aged 14 10

Frank Moxon, M.B.

A Luminous Type for Estimating the Light Sense in Night Blindness ... 11

Leslie Paton, F.R.C.S.

Neuro-retinitis after Chicken-pox 12

PAGE

L. R. Yealland, M.D.

Hysterical Disorders of Vision (Abstract) 13

P. C. Bardsley, M.B.

A New Form of Bi-focal for Myopes (Abstract) 16

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

John Bale, Sons & Danielsson, Ltd., 83-91, Great Titchfield Street, London, W.1

Section of Ophthalmology.

President—Mr. WILLIAM LANG, F.R.C.S.

Changes in the Vitreous resulting from Penetrating Septic Wounds.[1]

By R. H. ELLIOT, Lieutenant-Colonel I.M.S.

(ABSTRACT.)

THE contribution was illustrated by a profusion of slides taken from a wide experience in India. The author reviewed the paper on a similar subject published by Professor Straub in 1912, based largely upon the experimental injection of the eyes of two rabbits with tubercle bacilli, resulting in infection of the ciliary body. Professor Straub contended that the septic matter set up a chemotactic action in the surrounding vascular structures, and also caused optic neuritis. Colonel Elliot's present paper was based upon 780 cases of couching, and the anatomical examination of fifty-four globes.[2] The material was, therefore, more abundant than Straub's, and there was a greater variety in the conditions of infection, for in the practice of the operation by native Indians the instruments, hands, and surroundings were filthy; there was a great variation in the age and health of the patients, in the nature and virulence of the introduced organisms, in the period after operation at which the material was obtained, and in the methods of operation. Slides were shown of extreme interest, and he asked that they might be regarded as affording an opportunity for the elucidation of pathological problems, as a series of experimental infections of the eye with septic material. In couched eyes the appearances found in the vitreous included slight gauzy films, filmy masses in the anterior part of the chamber, a fine cone of exudate in the vitreous, an organized cone of exudate, masses of exudate scattered through the vitreous and isolated inflammatory foci therein, total detachment of retina with inflammatory matting of all parts, and the remains after panophthalmitis. He contended that the difference between the exudate massed in the anterior part of the vitreous and the cone of the vitreous was artificial; in his specimens this was proved by the breaking of certain specimens in transit from India. Localized infection of the vitreous was not met with, except in one case in which the tip of a copper probe was left behind, but the organization appeared to be strongest near the ciliary body and near the optic nerve head; this was a matter of vascular supply. The backward flow of lymph to the channels round the nerve head was suggested by the cone of exudate, and he showed specimens which supported his view: there were new-formed vessels in the apex of the cone of exudate. In the author's view, Straub's contention that hyalitis was due to chemotaxis following the deposition of septic matter in the vitreous took too little account of the infection of surrounding structures. The occurrence of plastic uveitis sufficed to explain the vitreous opacities seen during life, as well as the vitreous exudate seen in the specimens. Detachment of the retina was found in 70 per cent. of the cases, and this was explicable by the pouring of exudate into the vitreous chamber, adhesion of the exudate to the retina, and a shrinking of the exudate. Was the pouring of the exudate into the vitreous chamber due to chemotaxis from an infected vitreous, or to a primary infection of the surrounding vascular coats? He inclined to the latter view. In several cases the lens lay in front of the anterior hyaloid membrane, and in two of the cases the vitreous was not invaded by the instrument, yet there was an abundant vitreous exudate in these very eyes. The retina contracted adhesions to the exudate by the wound, and by inflammation the result of chemotaxis, by inflammatory thickening of the anterior layers of the hyaloid body, and by cicatricial bands radiating from the focus of infection.

---

[1] At a meeting of the Section, held February 6, 1918.

[2] *Lancet*, 1917, i, pp. 325-361.

DISCUSSION.

Mr. E. TREACHER COLLINS: This wonderful collection of specimens of Colonel Elliot's requires a good deal of study. The specimens abound in points of both clinical and pathological interest, not only from the standpoint of the operation of couching, but in many other directions. With regard to the infection of the vitreous humour, Colonel Elliot has referred a good deal to Professor Straub's work. I think the Professor's main contention was that a cellular exudate from the ciliary body is not thrown out from it by a sort of expulsive effort, but that it is drawn into the vitreous by a kind of magnetic attraction—i.e., by chemotactic action. Professor Straub showed, in his experiments on animals, that in the mild infections of the vitreous, which produce, clinically, dust-like opacities in the vitreous, each opacity consists of a little group of phagocytes, such as were shown very beautifully in one of Colonel Elliot's specimens. These groups of phagocytes are not scattered promiscuously throughout the vitreous, but are arranged definitely upon its membranes, on the outer side of the outer hyaloid membrane and in Stilling's canal. They are not due to the presence of a microbe in the middle of each patch; they are due to separate patches, with an arrangement which suggests an anatomical cause. Straub demonstrated this, but he did not offer a very adequate explanation as to how the patches are formed, and why there are several separate foci. He said it was due to chemotaxis, but he did not appear to demonstrate why chemotaxis acted more potently at certain points than at others. On that point I would like to make a suggestion, and in doing so, I propose to cite what may seem a rather far-fetched analogy. When travelling in the East, I have sometimes looked up into the blue sky and seen a number of little black points converging from various directions towards some central spot. When I got nearer, I found that these black points were birds—vultures, and that the spot on which they were converging was a dead carcass. In the vitreous we have a number of phagocytes converging towards central points, and at those points are, I suggest, dead bodies—i.e., the dead cells of the vitreous. When septic infection of the vitreous occurs, there is diffusion of toxin throughout it poisoning its fixed cells, these then become centres of chemotaxis. These fixed cells are mainly situated on the outer hyaloid membrane of the vitreous, where they are widely separated, and in its central canal. There are always a few of them in the cup of the optic disk, where the sheath of the central hyaloid artery was originally situated. These are the places in which we find these exudated phagocytes collect. Straub compared these dots which he saw in the vitreous to the dots met with in the anterior chamber on the back of the cornea which we call keratitis punctata, and he suggested that there must also be some chemotactic action going on at the back of the cornea which attracted the leucocytes to that region. He suggested that the cells are heaped up at the back of the cornea owing to the presence of a dead leucocyte which exerted chemotactic action. I suggest as more likely that it is a dead tissue cell which is desquamated from the surface of the ciliary bed or from the iris, and carried forward in the stream of the aqueous to the back of the cornea, which sets up the process of chemotaxis, and attracts phagocytes to it. In proof of it being a tissue cell is the fact that so often in keratitis punctata the dots are pigmented; the pigmentation can only come from cells of the uveal tract. While listening to Colonel Elliot's demonstration it occurred to me what an excellent thing it would be if we could have fifty of our own failures after cataract operation bottled as these specimens have been, photographed as Mrs. Elliot has photographed these, and analysed and demonstrated to us, as we have heard Colonel Elliot do this evening. For I hold that the study of our failures is the high road to success.

Mr. HERBERT PARSONS: When Professor Straub read his paper I criticized his term "hyalitis." I think there is perhaps not so much difference of opinion between Professor Straub and Colonel Elliot as the latter suggests: they are looking at the subject from slightly different points of view. I still object to the term "hyalitis" as indicating some active process taking place in what I regard as being, in the adult, an inactive or passive tissue. The specimens which have been shown to-night are of the greatest interest from many points of view; but on certain points in regard to infection of the vitreous they are not so useful as Professor Straub's, because the latter were experimental specimens, and were in the early stages of infection. The earliest stages of infection have been admirably investigated by Fuchs. There is then some localization of infection in the vitreous, but that rapidly passes into a general infection of the vitreous. One point Fuchs brings out beautifully in his specimens—one I have often corroborated—namely, that the extension of inflammation to the choroid always takes place first in the neighbourhood of the disk and in the vicinity of the ora serrata. The thicker part of the retina acts as a protective membrane to the major part of the choroid. Perhaps a little too much stress is laid on the triangular exudate, which really represents the whole of the shrunken vitreous. Another point is, I cannot conceive the lens being depressed or reclined or transmitted into the lower part of the vitreous chamber of the eye without injuring the vitreous very seriously indeed. There must be serious injury, whether the instrument goes through the sclera or whether it is introduced from in front.

Lieutenant-Colonel ELLIOT (in reply): In answer to Mr. Parsons: It is undoubtedly the whole of the vitreous impregnated by inflammatory material, which contracts either during life, or else later under preparation. In some of the cases it seems to have been an ante-mortem contraction: in others it was a preparation contraction. The difference is due to the different periods at which the globes were removed, the degree of gravity of the inflammation, and other factors. With regard to the other point raised by Mr. Parsons, if he would care to see the original specimens, I should very much like to have his opinion on them. Mr. Treacher Collins has seen a number of them, and we have looked at them again and again, with different illuminations. I am open to correction, but I do not see how one can take any view but that, in a certain number of them, the lens lies in a cavity in front of the vitreous body. My point was, that it did not break open the vitreous, and that there was no reason to believe that a septic instrument passed through the vitreous, and therefore that the vitreous changes found must in these eyes at least have owed their origin to the infection of the surrounding coats alone. If that is admitted for these instances, there seems no reason why it should not apply, in a great measure at least, to all the globes of the series presenting similar appearances. I probably am in closer agreement with Professor Straub than my fragmentary remarks to-night made me appear to be, but I think he laid too much stress on what I may call his stab culture experiment, and he implied that all the trouble in the vitreous came from the injection of septic matter into that body: he appeared to lay too little stress on the fact that a large amount of the trouble came from the ciliary body, the iris, and the other coats as a result of their own direct infection.

Note on the Direct Observation of the Fundus Oculi during a Period of Temporary Blindness.

By A. W. Ormond, F.R.C.S.

(ABSTRACT.)

[This paper is printed *in extenso* in the *British Journal of Ophthalmology*, May, 1918, p. 273.]

A MAJOR in the French Army, at present engaged in engineering work, came to consult Mr. Ormond. Five days earlier, in the evening, he had suddenly lost the sight of his right eye for about eight minutes, and since then he had had seven or eight attacks of equal duration. It was not followed by headache or pain. One attack occurred while he was in a darkened room. Some of the attacks seemed to be associated with his movements, such as stretching his arms after sitting in a cramped posture. He had lived for some years in the French Gaboon, and had suffered badly from lumbago. While giving his history he had an attack, and Mr. Ormond examined the eye while it was in progress. The pupil of the right eye enlarged to about 7 mm. in diameter. The optic disk was blanched, also the immediately surrounding retina. Veins alone of the vessels were evident, the superior and inferior retinals being those chiefly under notice. The inferior retinal showed distinct notching on the concave side only; there were four or five notches. While being watched they suddenly disappeared. The vein resumed a normal appearance. The patient then suddenly remarked: "It is coming back." In a few seconds he could see again, and the pupil contracted to the size of the other. The optic disk looked redder and more suffused than normal. The arteries showed their position, the superior artery twisting round the superior vein, and so causing the appearance seen when first looking at the eye. It seemed to have been a localized contraction of the central retinal artery, resulting in a temporary blanching of the disk and retina in the immediate neighbourhood, with a gradual lessening of the blood in the veins, so that the endothelial lining had become ruffled into horizontal folds as the lumen emptied. Subsequent pressure of the globe with the finger resulted in almost complete emptying of the artery and considerable depression of vision. Dr. John Fawcett's examination of the patient a few days later did not reveal any signs of organic disease. His maximum systolic pressure was 130 mm., and the radial arteries were good. Heart and urine were normal. The contraction of retinal arteries seemed to be similar to that in the "amblyopia of migraine." It could scarcely be regarded as intermittent claudication. The attack was probably due to sedentary life and excessive cigarette smoking.

DISCUSSION.

Mr. P. C. BARDSLEY: I have, for years, suffered from these attacks, and on two or three occasions the late Mr. Marcus Gunn examined my eyes at the actual time. His description is almost identical with that in this case. When I get these attacks I congratulate myself that my arteries are still not so rigid that they will not contract.

Mr. E. TREACHER COLLINS: Benson recorded a similar case to this of Mr. Ormond's in the *Transactions of the Eighth International Ophthalmic Congress*, and Mr. Priestley Smith referred to another, which went on ultimately to permanent blockage of the artery.[1] This is the danger in these cases. I have had one or two patients who came to me with a history of attacks of temporary blindness, and I have warned them of this danger, and advised them to carry nitrite of amyl about with them to use when they get an attack.

Mr. CARGILL: There was once under my care a young woman, engaged in business in the neighbourhood, who used to suffer from occasional attacks of partial blindness in one eye from temporary blocking of a primary branch of the central retinal artery, apparently due to spasm. The eye was observed in more than one attack and the appearances in the affected area were like those due to embolism, but I do not remember having noticed any notching of the retinal vein as described by Mr. Ormond. Eventually the arterial block became permanent, with a corresponding sector-shaped scotoma. I forget what was precisely the condition of her heart.

DISTURBANCES OF VISION BY CEREBRAL LESIONS. By GORDON HOLMES, C.M.G., M.D.

Read at a meeting of the Section, December 12, 1917, and published *in extenso*, with illustrations, in the *British Journal of Ophthalmology*, July, 1918, pp. 353-384.

---

[1] *Trans. Ophth. Soc.*, 1899, xix, p. 84.

Section of Ophthalmology.

President—Mr. WILLIAM LANG, F.R.C.S.

Case of Mooren's Ulcer.[1]

By F. A. C. TYRRELL, F.R.C.S.

THIS is the second case of Mooren's ulcer which I have shown before the Section. The first case was that of a man with the upper third of his cornea denuded. He was treated by means of a conjunctival flap. The cornea healed completely, and he had vision about $\frac{6}{12}$, or $\frac{6}{9}$ last time I saw him.

In this present case there was very extensive denudation. He came to St. Mary's Hospital about a year ago. He had a large denuded area, with a small circular area of epithelium in the centre of his cornea, 4 mm. across, and his vision was bare P.1. I tried cauterizing on two occasions, but it resulted in no apparent attempt at healing. I then tried the conjunctival flap method, using a purse-string suture. The conjunctiva adhered to the denuded area in the outer part, and the cornea vascularized, but it did not progress very satisfactorily. After keeping him under observation for about a month, I decided to unite the lids in the centre, so as to enable the conjunctival sac to be flushed through from side to side. That was a little less than a year ago. His cornea is now clearing up, his vision is fingers at about a metre, and you can see his pupil and iris showing, so that the cornea is steadily clearing, and no further ulceration has taken place. It is in a way, a contrast to the case I showed a year ago.

---

[1] At a meeting of the Section, held June 12, 1918.

DISCUSSION.

The PRESIDENT: Recently I saw a case, very like a Mooren's ulcer, which had been going on for several months. I touched it with flavine: it was the first time I had used solid flavine. It caused great pain, but the ulcer healed. A solution of 1 in 1,000 acts very well in marginal ulcers.

Mr. LESLIE PATON: The way in which keratitis clears up after sewing the lids together in neuropathic cases led to sewing the lids together in this case. The same is true of herpes with deep corneal ulceration: sewing of the lids leads to rapid clearing up of the corneal condition. In neuropathic keratitis following removal of the Gasserian ganglion, or alcohol injections into the ganglion, once the lids have been sewn together there is a danger of breaking down the adhesions. I have tried in several cases, after two or three months, to break down the lid adhesions, and I can get down to 1 mm., but if I break through that last millimetre, then within a few days there is a relapse, and the cornea clouds over again. In one case I have tried to open the lids four times at intervals of six to twelve months, and each time have had to sew them together again in a few days. In none of these cases had any sensation returned.

Mr. TYRRELL (in reply): It will be better in this case to leave the lids sewn together. There is only a small union in the centre, and the man can find his way about by looking out of the corner of his eye. He is, unfortunately, blind in the other eye.

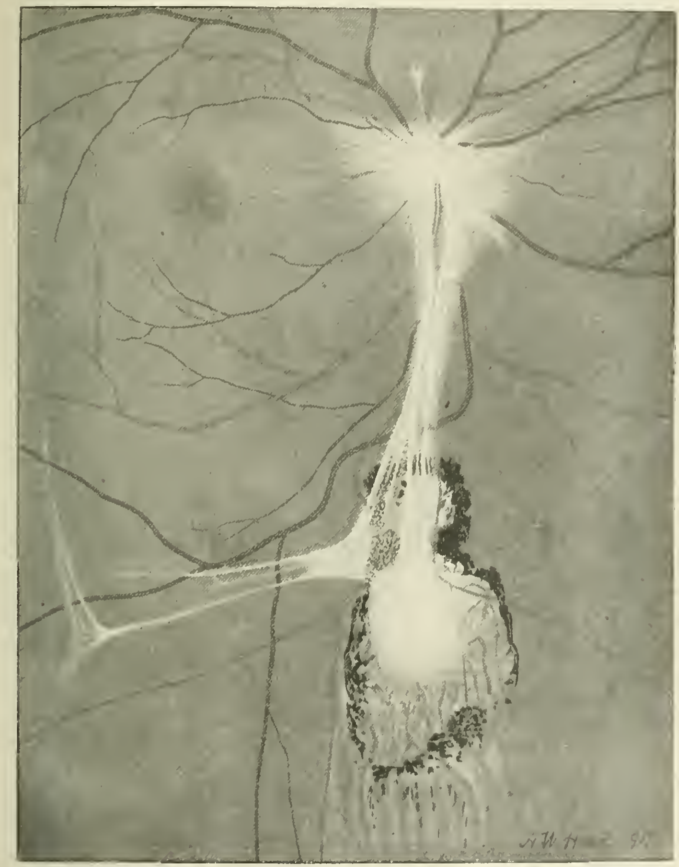
Old Choroidal Scar with Fibrous Band stretching from it to the Disk.

By MALCOLM L. HEPBURN, M.D.

THIS drawing illustrates the condition of the fundus in the right eye which was discovered in the routine examination of a patient who came to the Royal Free Hospital for glasses. The vision was $\frac{6}{9}$, and there was no history of injury of any kind nor of inflammation.

I am not aware of having seen before an ordinary patch of choroiditis with fibrous bands passing through the vitreous and connecting it with the disk; and it is an interesting pathological problem how to explain this condition.

It is well known that there exist lymphatic channels which, under certain circumstances, carry inflammatory products from the interior of the eye to the outside, but this is not the usual mode of exit in



As described in Dr. Hepburn's paper.

choroidal inflammations. All the clinical evidence points to the fact that inflammatory products in such cases leave the eye at the anterior part of the globe; and this case may be an exception to the rule. On the other hand, as the choroidal scar is situated in the lower part of the fundus, this may have been a congenital inflammation which caused atypical development in the mesoblastic tissue, which was invaginated at the time of the formation of the secondary optic vesicle and ocular cleft.

Coloboma of Optic Disk and Choroid.

By G. Harvey Goldsmith, M.D.

J. E., male, aged 23; by occupation, a miner. Right eye: Microphthalmos; no perception of light; a coloboma of the iris and very large coloboma of the choroid. Left eye: Vision $\frac{6}{60}$; hypermetropic, 2·00D. The iris is normal. The diameter of the disk is enormously increased. The nerve tissue is reduced to a very narrow crescent, proportionate to a moon one day old, which bounds the upper and outer quadrants of a deep crater. Vessels lying on the floor of this crater can be well defined with a −18·00D. sphere. There is a small colobomatous crescent on the side of the crater opposed to the head of the nerve and a larger crescent contiguous to the lower margin of the cavity in the usual position of a coloboma of the choroid. Before the vessels on the floor of the depression were focused, the illusion that the semi-transparent white object almost mathematically circular, and bordered by a shadow, was an elevation and not a depression, was very strong.

Implantation Cyst in a Girl, aged 14.

By A. B. Roxburgh, F.R.C.S.

The development of the cyst followed the striking of the eye four years ago by a toy aeroplane made of tin. The mother said that operation was performed immediately, and probably the prolapsed iris was removed. It caused no trouble until three weeks ago, when some pain and pricking were complained of. The mother noticed a dark spot in the eye; now, however, vision has fallen to $\frac{6}{12}$. The tension is but little raised. Some iris is adherent to the back of the cornea. Beneath the cornea there is a translucent cyst, about $4\frac{1}{2}$ mm. wide, which appears to be embedded in the iris. The cyst has recently somewhat encroached on the pupil and probably accounts for the reduction in vision.

Mr. TREACHER COLLINS: I agree with Mr. Roxburgh in thinking that this is an implantation cyst, and it is very important that it should be removed, as it will, otherwise, almost certainly go on growing, eventually filling the anterior chamber and producing increased tension. I have removed an implantation cyst of the iris in one case without any recurrence. If Mr. Roxburgh attempts removal in this case, it will be well for him to remove a piece of the iris, behind the cyst, as well as the cyst itself, because if he leaves any of the epithelial lining, it is almost sure to extend, either forming a fresh cyst or spreading round the anterior chamber.

A Luminous Type for Estimating the Light Sense in Night Blindness.

By FRANK MOXON, M.B.

DURING the last three and a half years I have made a particular study of night blindness occurring among the troops. I wish here to draw attention to a special type that I have had made to assist in forming an estimate of the degree of dark adaptation in the hope that it may be found of use, more particularly to those, who, like myself, are engaged in Army ophthalmic work and therefore require a handy test. It is a development of a rough test, which is frequently used—namely, that with the so-called wrist-watch with luminous figures. The figures on these watches are however too small and arranged in a too well-known manner for accurate results to be obtained.

The following type overcomes the difficulties: It consists of a single row of five letters, each letter corresponding in size to those of the $\frac{6}{12}$ line of the ordinary test type; these are painted with the best radium paint on a black background; each letter is slightly sunken so as to avoid lateral diffusion of the light, with consequent running together of the letters; the whole is covered with glass and mounted in a frame measuring approximately 8 in. by 2 in: The normal-sighted individual is able to read these letters in a completely darkened room, after allowing a period of twenty minutes to elapse for dark adaptation, at an average distance of 4 ft., while the light from the letters can be seen as a streak of light at a distance of over 60 ft. Although I do not claim that this is a particularly accurate test, yet it can be made use of if employed with discretion and skill, and is as accurate and certainly more easily controlled than, for example, Forster's photometer or the luminous wrist-watch. Perimetry in a darkened room should, of course, always be employed in these cases, and Bjerrum's test types sometimes may be found helpful.

The luminous type, as described, is made by Messrs. John Weiss and Son, Ltd.

Mr. MAYOU: I have asked Dr. Lynham, of the Radium Institute, about the material from which these types are made. He has handed me a paper by Patterson and Higginson in the Physical Society's *Transactions*, in which it is said the paint is usually made of radium bromide with zinc sulphide. The radium bromide particles bombard the zinc sulphide, and so produce luminosity. When the paint is freshly made, the luminosity is at its greatest, and it diminishes rapidly for the first six weeks and more slowly afterwards, and at the end of a year its luminosity is about half what it was at the beginning. These types cannot, therefore, be used as a standard for comparison with other types, because the luminosity varies with the amount of radium used, with the quality of the zinc sulphide, and with the size and thickness of the lettering. If the letters are very thick, the image is blurred, if very fine they cannot be seen. These experiments have been worked out because the paint is very much used for compasses, &c. The luminosity is tested against a screen with a light behind it of standard power and a green glass. It seems probable that the most satisfactory scientific test would be to use a screen with a light behind of similar character, not by means of luminous paint, although the latter may be very useful as a rough test to be used in the field.

Neuro-retinitis after Chicken-pox.

By LESLIE PATON, F.R.C.S.

R. J., MALE, aged 14. Patient and two brothers had varicella in December. The attack was a very severe one. The temperature rose to 103° F., and there was some headache. On the third day of the illness he found that the left eye was blind and sight has remained very defective in that eye since. He came to St. Mary's Hospital on April 9.

Condition (April 9, 1918): Right vision, $\frac{6}{6}$; left vision, $\frac{6}{60}$. Pupils act, but left pupil does not maintain contraction well when right eye is shaded and sometimes shows a condition resembling hippus, but more irregular. Right optic disk, normal; left optic disk, pale; edges blurred, especially in upper half. No swelling. Retina somewhat obscured, but showing some irregular spotting towards macula.

Rhinoscopy and X-ray examination of the accessory sinuses were negative. Visual field shows an irregular central scotoma and some peripheral limitation.

Dr. Reginald Miller reports that though there is some trace of albumin in his urine there are no casts, nor evidence of organic renal disease.

Hysterical Disorders of Vision.

By L. R. YEALLAND, M.D.

(ABSTRACT.)[1]

THE author grouped hysterical disorders of vision into two classes according to whether or no the contraction of antagonists could be demonstrated—i.e., the contraction of a group of muscles which should be relaxed during the performance of a given movement. The phenomenon might be demonstrated in blepharospasm, ptosis, and spasm of accommodation. In blepharospasm there was simultaneous contraction of the levator palpebræ superioris and of the orbicularis oculi; the failure of the relaxation of the latter muscle prevented the eye opening and so there was apparent loss of vision. A condition of blepharospasm intervened in ptosis before recovery was effected. The phenomenon could not be demonstrated in such conditions as limitation of the visual fields and amblyopia, but in these contraction of antagonists in some other parts of the body might be observed.

DISCUSSION.

The PRESIDENT: We have all come across such cases as Dr. Yealland describes, and, unfortunately, I have known some of them to be treated as cases of real and serious defect, and to be operated upon in a disastrous manner, for complete ptosis, for example. I recall the case of a young man, aged 23, thirty years ago, who had a contracted field of the typical hysterical kind. One of my favourite means of demonstrating the presence of an hysterical contracted field is to arrange stools or other obstruction in his path and to tell the patient to fix his eyes on a distant object and walk towards it. He always walks round the obstruction in hysteria, as did this man, but to my surprise, when I looked into this man's fundus I found a hæmorrhage in the retina, so that probably he had something else too. Later he developed some digestive trouble, and while at the seaside, after eating some oysters, died suddenly. The nature of the case was never solved.

---

[1] The full paper will appear in the *British Journal of Ophthalmology*.

Mr. RICHARDSON CROSS: The uniformity of the field of vision in these cases is noteworthy. It is a very extraordinary thing how an hysterical patient, when the field is carefully tested on three or four different occasions, and at considerable intervals, weeks or more, will give the same field each time, within 5°. The memory cannot account for it. If an hysterical patient were to come one day with a field of a certain extent and with certain faults of central vision, and next day it had varied, and on a further occasion it varied again, one would not be surprised, but on the contrary there is little or no change on each occasion.

The PRESIDENT: This uniformity must be very strange, because I have gone over the field twice, and have found it go steadily in, but never to overlap. These patients never make a mistake. Someone has said that if you reverse the movement the field enlarges. I do not know whether that is the experience of others. I gather that the application of electricity spoken of was not without discomfort: I suppose that is the essential feature of the application. Electricity is not essential: you can get the same results with cocaine. On one occasion a patient was brought to my consulting room in the usual procession—a blind person in the middle of two friends. The patient, a woman aged about 30, had spent eighteen months of her life in a dark room for a similar attack. The attack was sudden, and when she came to me the next day she could not see light. After a drop of cocaine in each eye, and the assurance that it would cure her, she went away seeing $\frac{6}{6}$ and J1 within a quarter of an hour. Persuasion is the important thing. You can do it kindly: most of these cases can be treated with kindness; never say they are humbugs. There are many ways of persuading these patients.

Mr. LESLIE PATON: If you have had a case under treatment for some time, it is impossible to get it better. The extraordinary thing is the change in the mental attitude of the patient from the beginning to the end of the treatment. In the case of one man I sent to Dr. Yealland, he had been to various places, where various diagnoses were made, one of them having been interstitial keratitis: most of them were keratitis of some sort. There was complete blepharospasm, and at first I could not see the cornea at all. On the second occasion I caught a glimpse of the cornea, and saw nothing wrong with it. He had been nine months under treatment, and had been to seven hospitals. The man looked miserable, and felt convinced that nothing would do him good. I had to go to the hospital the afternoon after he had been treated and I found him playing billiards in a cheery fashion. I remember a similar case in which both eyes had been suffering from extreme blepharospasm. He was in a state of misery before being treated. I went round the wards, and one and a half hours later found him playing billiards. But there is a risk, and that risk the first man I mentioned showed distinctly. He had been seen by many students at St. Mary's before he went to the National Hospital. When he came back he was a "miracle case" for a day or two, a man who, after being blind nine months, had been cured in half an hour. Students began examining him, and he promptly started having functional fits. We put a screen round him, forbade students examining him, and no more fits occurred. I think that just as you can chase a tic from one part of the body and it will reappear in another, so an hysterical condition can change its manifestations.

Mr. A. W. ORMOND: In all the cases I have known, the sufferings of the patient have been very considerable. And as these patients are afterwards so much brighter and better, as Mr. Paton says, it is clear that when we speak of them as "functional" or "hysterical," we are only using terms, and are not explaining the condition. There is a something about them which is not "humbug," something which we cannot explain: but because we cannot explain conditions we ought not to dispute their existence. I think Dr. Yealland's treatment can be summed up as "suggestion" treatment, in many cases suggestion under a certain amount of pressure, inconvenience and pain. At the beginning of the War I had about fifteen of these cases which I treated by hypnosis. I had had no experience of hypnosis before that—and have had none since. I succeeded in all the cases, though my procedure was a very simple one. The worst case was that of a man who was dumb, deaf and blind. His dumbness was partly cured by someone who had worked at him at Devonport before he came to me. I got him to see perfectly well after one or two attempts at hypnosis, and he remained cured. But the mischief about his deafness was, that some kind friend gave him an electrophone, which he wore. As long as he had got this on some part of his anatomy he could hear, but not unless he had it with him. He had been so convinced that his blindness and deafness were real, that he had taken the utmost pains to learn Braille, to do lip-reading, &c., to carry on conversation. We got him well, and he has returned to the Army, but the case took a long time. No electricity was used, but constant and repeated suggestion. I have always been sorry for these people, because I felt they were so liable to be classed as humbugs. When cured, they are the most grateful patients imaginable.

Dr. YEALLAND (in reply): In answer to Mr. Richardson Cross, I have not found consistency of contraction of the visual fields in a series of examinations of my cases. I believe that a good deal depends upon the observer. In my cases, the fields were first of all mapped out on a Bjerrum screen (the patient being seated at 1 metre distance), then mapped out on an ordinary perimeter, and finally mapped out on a Bjerrum screen at 1½ metres distance from the patient. The result indicated a decided inconsistency. The President asks, is the electricity painful? Electricity produces a pain sensation. Pain is psychic, and as such it is a matter of the opinion of the patient as to whether it is distressing or not. In answer to Mr. Ormond, I have not employed hypnotic measures, and I do not know what to say about their efficacy. I have not a high appreciation of hypnotism in these cases, as nearly all my patients had hypnosis practised on them and some of them liked it very much.

A New Form of Bi-focal for Myopes.

By P. C. Bardsley, M.B.

(ABSTRACT.)[1]

The author contested the idea that in early life the myope should wear continuously fully-correcting glasses. There was no evidence that lack of full correction in the case of a myope increased the degree of his defect. Why should myopes be robbed of the privilege of using their ciliary muscles? The new bifocal glass was designed to remedy the distortion of image produced on looking down through the ordinary bifocal. The lower glass is ground at an angle to the upper glass, so that the eye looks down at right angles to the plane of its surface, as it does also to the plane of the upper glass.

---

[1] The full paper will appear in the *British Journal of Ophthalmology*.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY
J. Y. W. MacALISTER
UNDER THE DIRECTION OF
THE EDITORIAL COMMITTEE

VOLUME THE ELEVENTH
SESSION 1917-18

SECTION OF OTOLOGY

1 - 81

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1918

Section of Otology.

OFFICERS AND COUNCIL FOR 1917-18.

President—

H. J. BANKS-DAVIS, M.B., F.R.C.P.

Vice-Presidents—

J. S. FRASER, F.R.C.S.Ed.
HUGH E. JONES.
DAN MCKENZIE, M.D.
SYDNEY SCOTT, M.S.

Hon. Secretaries—

SOMERVILLE HASTINGS, M.S.
J. F. O'MALLEY, F.R.C.S.

Other Members of Council—

H. S. BIRKETT, C.B., M.D.
G. A. CARTER, F.R.C.S.Ed.
E. D. D. DAVIS, F.R.C.S.
P. G. GOLDSMITH, M.D.
ALBERT A. GRAY, M.D.
W. STUART-LOW, F.R.C.S.
H. J. MARRIAGE, F.R.C.S.
W. M. MOLLISON, M.Ch.
N. H. PIKE, M.B.
HERBERT TILLEY, F.R.C.S.

Representative on Library Committee—

GEORGE C. CATHCART, M.D.

Representative on Editorial Committee—

DAN MCKENZIE, M.D.

SECTION OF OTOLOGY.

CONTENTS.

November 16, 1917.

H. J. Banks-Davis, M.B. — PAGE

President's Address 1

The Report of the Committee of Otological Research 4

H. J. Banks-Davis, M.B.

(1) Boy, aged 11, with a Cystic Swelling occluding the Right Cartilaginous Meatus; ? Dermoid Cyst 6

(2) Foreign Body, a Green Pea, removed from Middle Ear by Post-aural Operation on a Boy, aged 10 7

E. D. D. Davis, F.R.C.S.

A War Injury of the Ear 8

Somerville Hastings, F.R.C.S.

Case of Cholesteatoma exposing the Lateral Sinus 10

W. M. Mollison, M.Ch.

Case of Complete Deafness and Complete Loss of Labyrinth Function; ? Cause 12

E. B. Waggett, M.B., Major R.A.M.C.

Myiasis of the Ear—Larva of the Flesh Fly 14

T. Mark Hovell, F.R.C.S.Ed.

Gastro-intestinal Sepsis, a Cause of Ménière's Symptoms 15

February 15, 1918.

DISCUSSION ON THE INFLUENCE OF DISEASES AND ABNORMALITIES OF THE NOSE ON THE EAR.

Dr. WILLIAM HILL (p. 25); Mr. NORMAN PATTERSON (p. 31); Mr. LAMBERT LACK (letter) (p. 32); Sir STCLAIR THOMSON (p. 32); Dr. ALBERT GRAY (p. 33); Mr. CHARLES HEATH (p. 34); Dr. WATSON-WILLIAMS (p. 34); Mr. CLAUD WOAKES (p. 36); Professor URBAN PRITCHARD (p. 36); Mr. MARK HOVELL (p. 37); Dr. DUNDAS GRANT (p. 38); Dr. P. G. GOLDSMITH (p. 39); Dr. JOBSON HORNE (p. 40); Mr. W. STUART-LOW (p. 40); Dr. KELSON (p. 41); Mr. HERBERT TILLEY (p. 41); Dr. DONELAN (p. 43); Sir STCLAIR THOMSON (p. 43); The PRESIDENT (p. 44); Dr. WILLIAM HILL (reply) (p. 44).

April 19, 1918.

RICHARD LAKE, F.R.C.S. PAGE

Aural Bacteræmia, with Illustrative Cases (Abstract 47

H. J. BANKS-DAVIS, M.B. (President).

(1) Recurrent Herpes of Auricle in a Boy, aged 9 53
(2) Acute Mastoiditis in a Boy, aged 8; Spontaneous Recovery ... 54
(3) Parotid Fistula of Twelve Months' Duration in a Man, aged 50 ... 55
(4) Depressed Scar following Mastoid Operation 56

RICHARD LAKE, F.R.C.S.

(1) Latent Mastoid Abscess 57
(2) Extradural Abscess perforating Skull 59
(3) Loss of Hearing due to Delay in Operating 60

W. M. MOLLISON, M.Ch.

Case of Cerebral Abscess; Hernia cerebri; Avulsion of Abscess Wall; Complete Homolateral Ophthalmoplegia; Recovery 61

P. WATSON-WILLIAMS, M.D.

Case of Subacute Mastoiditis; Paralysis of corresponding Sixth Nerve, recovering; Latent Maxillary Antral Infection, illustrating the advantageous Exploration of Sinuses by the Suction Syringe ... 62

HERBERT TILLEY, F.R.C.S.

Concentric Narrowing of each Meatus following Scarlet Fever at the age of 5 65

L. H. PEGLER, M.D.

Case of Aural Fibroma 67

May 31, 1918.

HERBERT TILLEY, F.R.C.S. PAGE

A Series of Consecutive Cases in which the Mastoid has been operated on for Acute Suppurative Inflammation, B.I.P. (bismuth, iodoform, and liquid paraffin) inserted, and the External Wound sutured in its entire length at the Close of the Operation (Abstract) ... 69

J. DUNDAS GRANT, M.D.

Case of Chronic Suppuration of the Middle Ear and Cholesteatoma treated by Radical Mastoid Operation, with Retention of the Cholesteatoma Matrix 77

DAN MCKENZIE, M.D.

Case of Orchitis and Deafness 79

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

London:
John Bale, Sons and Danielsson, Ltd.,
Oxford House,
83-91, Great Titchfield Street, Oxford Street, W. 1.

Section of Otology.

President—H. J. BANKS DAVIS, M.B.

(*November* 16, 1917.)

PRESIDENT'S ADDRESS.

By H. J. BANKS DAVIS, M.B.

MAY I say a few words before we commence the work of the Session in order to express to you how deeply sensible I am of the honour which the members of this Section have conferred upon me by electing me their President. I need not say that during my term of office I intend to do all I can to maintain the high reputation which this Section enjoys.

Election to the Membership of the Otological Section has never been easy, as the qualifications demanded are very high and very special, and as a result of this nearly all members are teachers of otology and officers in charge of clinics of their own, in well-known special and general hospitals. This *may* be an excellent thing—personally I think it is—so long as it is remembered that the *Proceedings* of the Section are read very widely by medical men who may not have the same opportunities of acquiring special knowledge in otology as we have, but who are anxious—and rightly so—to keep abreast of modern advance in the pathology and treatment of aural diseases. I say this, as I am inclined to think, and I am sure that others will agree, that there has been a tendency of late years to report upon and exhibit cases at our meetings of unusual and special interest only—on the assumption that other than these can be of no interest to members, who in their clinics see plenty of such cases themselves. This vein is apt to permeate the discussions and some very practical and useful remarks that an exhibitor or speaker might make, as a result of his own experience, are not made at all, and much information is unrecorded and lost. Everybody's *experience* is always worth recording, although everybody's *opinion* may not be.

Some years ago, when I was a Secretary to the Section in pre-war days, I often found great difficulty in inducing members to exhibit cases and records of their experiences, the usual excuse being "it is no use showing such a case as that as everybody knows all about it." I sometimes observed that when the case was brought forward nobody seemed to know anything about it, and sometimes not even the exhibitor himself.

It is part of our duty as a Section to promote knowledge as much as possible among other members of the medical profession as well as among ourselves, and I hope that you will do all you can—even in these days—to make our meetings a success by exhibiting cases, relating their histories, and better still by coming to the meetings and telling us what you know to the mutual advantage of us all.

Owing to the exigencies of the war many of our prominent members are occupied with military duties elsewhere, and as a consequence the Council have thought it desirable to curtail the usual number of meetings. The February meeting will be devoted to a discussion on "The Influence of Abnormalities and Diseases of the Nose on the Ear." It is high time that this important matter should be settled, and the expression of our opinion as a Section given one way or the other; some of us appear to disregard this influence altogether, others appear to attach too much importance to it. Which is right?

This question has really an important bearing on aviation. Experience shows that aviators with nasal obstruction and other nasal irregularities sooner or later are liable to be handicapped by disturbances of equilibration when flying. On making rapid ascents or descents they become giddy, confused and uncertain of themselves; but when the nasal deformity is rectified these symptoms vanish. This is my own experience. In a minor degree this applies to gunners in the naval and military services who are exposed to severe aërial concussions. Observations on these points should be brought before the Section, and the discussion should enable us to come to a reasonable conclusion, so that our edict may go forth and be recorded as "official to date."

Several other points I should like to see brought forward: What, for instance, is the best after-treatment for operations on the mastoid? What is the experience of members after packing the cavity with

Morison's paste? Personally I have tried all after-treatments recommended, including the blood-clot dressing introduced by Holmes, of Cincinnati, U.S.A., and a very good one it is. I find that Morison's paste packed *lightly* into the wound accelerates repair and shortens the after-treatment considerably, but I have also observed that if too much is packed into the wound—especially into the middle ear where absorption is more rapid—symptoms of poisoning are apt to supervene, not from the iodoform, but from the bismuth, as shown by a blue line on the gums, abdominal pain and nausea. Is this usual or is it very exceptional? In cases complicated by cerebral abscess I never use this paste as it impedes drainage owing to its consistency. Is this the experience of others?

Again, have we any better or more modern treatment to shorten the duration of an Eustachian catarrh with a simple catarrhal otitis media, which since the war has been unusually prevalent? The course of some of these cases is protracted and a great deal of incapacity from deafness results which seems to be out of all proportion to any signs observable in the membrane. I find the average duration of these cases is often many weeks, in spite of the usual treatment—e.g., cocaine and adrenalin drops, menthol vapours, blistering, nasal insufflation, and so on. Is there any advance in the treatment of this affection? If so, let us have it.

Again, can nothing more be done to alleviate the symptoms of otosclerosis—and how can cases of otosclerosis always be distinguished from those of chronic adhesive catarrh—or rather the results of attacks of chronic adhesive catarrh where symptoms of otosclerosis are present, but where the membrane appears normal—i.e., is not yet affected—and where adhesions are confined to the inner tympanic wall binding down the stapes and producing symptoms of otosclerosis—although these adhesions are not observable? Otosclerosis is often a simulated disease, and I submit that this is the reason.

And, lastly, for tinnitus—the "bugbear of otology"—what is the best treatment for relieving this? Or must we continue to disregard it unless we happen to have it ourselves?

I am sure that the experience of many of our members on the above points would be invaluable. The most important diseases are those that are the commonest, and any modern methods advocated by members of this Section for the alleviation of these would be most acceptable to us as otologists as well as of inestimable value to the outside world.

(*November* 16, 1917.)

The Report of the Committee of Otological Research.

The Council of the Section of Otology appointed a Committee to organize otological research, and this Committee met at 109, Harley Street, W., on December 8, 1916; January 19, March 30, and July 20, 1917.

(*A*) The Committee considered the question of the exchange of cases and agreed that:—

Any member of the Section who has undertaken to investigate cases of a certain type, and who desires material, should apply to the Committee, and other members will be informed on the Agenda Paper and at the Meetings of the Section, and will be invited to send such cases or notes to the investigator.

The difficulty of standardizing the tests for hearing was recognized as very great, but it was decided that greater detail of the tests for hearing used should be given in the reports of cases.

(*B*) A scheme for the tests of hearing was discussed and drawn up as follows:—

R. CONVERSATIONAL VOICE. *L.*

Single words or sentences with opposite ear closed.

Distance from ear expressed as a fraction with distance at which voice is heard from normal ear as denominator.

WHISPER.

Conditions as above, but whisper produced by residual air after forced expiration.

It is recognized that the voice tests are approximate only, as it is impossible to devise an exact standard. The words or phrases used to be recorded when possible.

WATCH OR POLITZER'S ACOUMETER.

Distance from ear expressed as a fraction with distance at which watch is heard by a normal ear as denominator. The acoumeter should be held strictly vertically.

TUNING FORK TESTS.

R. *Lateralizing Test (Weber's).* *L.*

Base of vibrating fork to be firmly pressed on mid-line of forehead and patient asked on which side it is more distinctly heard.

Relative Bone and Air Conductor (Rinne).

The vibrating fork is alternately pressed firmly on the mastoid and held with limbs vertical and vibrating in coronal plane close to the meatus, the position in which the tone is heard longer being noted.

Absolute Bone Conduction (Schwabach and Bing's Tests).

In these tests the perception of a tuning fork pressed on the mastoid of a patient and of a normal observer is compared—(1) with the meatus open (Schwabach), or (2) with the meatus closed lightly by the finger (Bing). The difference of the duration of perception expressed in seconds between the ears of observer and patient is noted.

Tone Range.

(1) (*a*) Upper limit of air conduction by Edelmann-Galton whistle or steel monochord (gauge of wire to be stated). (*b*) Upper limit of bone conduction by steel monochord.

(2) Lower limit of air and bone conduction by tuning forks.

In all tuning fork tests the number of vibrations per second, and whether single or double, and the make of fork to be stated in each case.

(*C*) The method of preservation of specimens recommended:—

The subject should be kept in an ice chamber after death, or wool soaked in formalin placed in each ear, and at the post-mortem both temporal bones should be removed by a sharp chisel, the superior semicircular canal opened, and the specimen placed in a 10 per cent. solution of formalin (40 per cent.).

Investigators are referred to the Committee if they require further information.

EDWARD D. D. DAVIS, } *Hon. Secretaries.*
SOMERVILLE HASTINGS, }

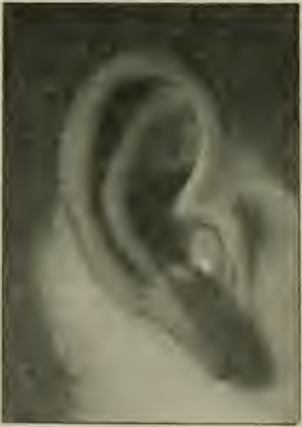
October, 1917.

(*November* 16, 1917.)

Boy, aged 11, with a Cystic Swelling occluding the Right Cartilaginous Meatus; ? Dermoid Cyst.

By H. J. Banks Davis, M.B.

The swelling, which is on the anterior and lower meatal wall, is elastic, and a speculum can be passed beyond it, revealing some secretion from the dermoid cyst. There appears to be a fine scar over the swelling, and the parents say that six years ago the boy was taken into the Infirmary "and kept there six weeks after an operation." Present symptoms are deafness and tenderness when the swelling is pressed. The photograph of the auricle, taken by Dr. Morton, clearly shows the site of origin of the cyst, which at first sight looks like a polypus which has become epithelialized.



DISCUSSION.

Mr. E. D. D. DAVIS: It might be a sebaceous cyst. I have seen two in that position, one of which I dissected out.

The PRESIDENT (in reply): What I first took to be a thick middle-ear discharge was really secretion from the cyst which had ruptured near the membrane. The scar of an old incision over the swelling is apparent, but as the cyst was not dissected out it has slowly refilled. I have never seen a dermoid cyst in this region before; speaking generally, when a sebaceous cyst has suppurated it ceases to exist, but this does not apply to dermoid cysts wherever situated.

(*November* 16, 1917.)

Foreign Body, a Green Pea, removed from Middle Ear by Post-aural Operation on a Boy, aged 10.

By H. J. BANKS DAVIS, M.B.

A FORTNIGHT ago an attempt was made in the Casualty Department to remove a supposed foreign body, which the boy stated he had pushed into his ear. After a long examination nothing could be found. The boy developed facial paralysis, and was lately admitted into the hospital. Yesterday I opened up the middle ear and extracted a large pea with the husk complete—as shown in the specimen. It is very much swollen and looks as large as a hazel-nut.

In 1913, as members may recollect, I exhibited a case of a boy aged 9, where a mastoid operation was performed for prolonged otorrhœa (six months' duration),[1] and where I removed a horsebean from the middle ear. The presence of a foreign body was never suspected. The entire mastoid was necrosed, and the facial nerve and digastric muscle, bathed in pus, were seen lying at the bottom of the wound. Facial paralysis was present.

In 1912 I exhibited a case where a foreign body was retained in the nose for *fourteen years*. It was a grain of Indian corn, which was germinating. A child had pushed this up her nose instead of giving it to her canary,[2] and there it had remained impacted in the olfactory cleft.

---

[1] *Proceedings*, 1913, vi (Otol. Sect.), p. 13.

[2] *Proceedings*, 1912, v (Laryng. Sect.), p. 97.

(*November* 16, 1917.)

A War Injury of the Ear.

By E. D. D. Davis, F.R.C.S.

Private McI. received a shell wound of the left malar region immediately in front of the ear on September 6, 1917. There is slight trismus due to injury to the mandible, and loss of sight of the left eye. The left external auditory meatus shows some granulation tissue in the outer half of its roof, and there is a healing perforation of the posterior inferior quadrant of the drum. The loss of hearing is very considerable and the results of hearing tests are :—

R.		*L.*
	Watch	$\frac{0}{100}$
	Conversational voice	½ ft. 25 ft.
	Whisper	0
	Lateralizing test (Weber):	
+	512 d.v.	—
	Relative bone and air (Rinne) :	
	512 d.v.	—
	Absolute bone conduction (Schwabach) :—	
	512 d.v.	– 2
	256 d.v.	– 7
	Tone range :—	
	Upper limit, air and bone	1,024 d.v.
	Lower limit, air and bone	32 d.v.
	Inflation	No improvement.

The nose shows injury in the left middle turbinal region with a dark antrum, but syringing of the antrum produced no pus.

"The case illustrates a type of injury in which the deafness is considerable and usually permanent."

DISCUSSION.

Mr. Sydney Scott: It would have been interesting to have known the result of testing with the monochord in this case, for there appears to be something anomalous in the loss of high tones if the upper limit is 1,024 d.v. per sec., and the almost negligible loss of bone conduction. From the man's manner too, I suspect the apparent state of hearing is influenced by temporary psychological impressions, and doubt whether the apparent state of hearing is real.

Lieutenant-Colonel P. GOLDSMITH: The monochord findings as to the bone conduction of this case would have been helpful, furthermore it might have been useful to determine how he reacted to the fatigue test with tuning forks and the noise apparatus. It is not impossible that this soldier had a chronic middle-ear suppuration which has since cleared up. The situation of the wound and the probable course of the bullet is not one likely to cause a tympanic wound, though bullets have a curious way in inflicting damage, as you have all seen in war wounds. If he had an old middle-ear lesion one could readily understand his deafness being increased, though the drumhead has healed. I suggest that the after-history of this case be recorded at some future time, and additional tests undertaken to eliminate a functional element which I cannot help thinking largely predominates.

Mr. E. D. D. DAVIS (in reply): The man has improved very much: the granulation tissue in the roof of the meatus has gone, and the perforation in the posterior quadrant is healing. There was considerable suppuration when I first saw him. $\frac{0}{100}$ means he does not hear the watch at all; my watch is heard at 100 in. from the normal ear. The normal ear hears my voice at 25 ft. As the tests were done hurriedly in the out-patient room on the first occasion, they were repeated. They may be a little inaccurate. He had suppuration in the right ear some years ago, but there is not much loss of hearing. Though the suppuration of the left or injured ear has cleared up, there has not been any improvement in the hearing. With regard to the case being permanent, I have seen a number of cases of injury in the mastoid and malar regions, as well as to the base of the skull, and I have watched them for a long time, during which they have made no progress in hearing at all. It is not like concussion-deafness, in which there is improvement within six weeks or two months, or a case of ruptured drum, in which improvement will set in as soon as the rupture has healed. I do not think there is a functional element in this case. I have tried to catch him out, but have not employed a noise machine. The injury was obvious, because it went across the roof of the auditory meatus. I will try to follow up the case, and make a further report.

(*November* 16, 1917.)

Case of Cholesteatoma exposing the Lateral Sinus.

By Somerville Hastings, F.R.C.S.

L. H., a woman, aged 33, was first seen by the exhibitor in July, 1917. She gave a history of chronic discharge from the right ear for eight years, and of pain in this ear of a few weeks' duration. She stated that she had never had any operation on the ears. The right ear was filled with pus and epithelial débris, and when this was removed a large smooth-walled cavity was exposed, all trace of the membrana tympani and ossicles being lost. The walls of this cavity were ulcerated in places, and posteriorly for about ½ in. the lateral sinus was exposed. Its pulsation was at first much more clearly seen than it is to-day. The patient hears fairly well with the left ear (Politzer's acoumeter 10 ft.) but the hearing in the right ear is very defective. With the noise machine in the left ear no tuning fork is heard by air conduction, C_{2048} is not heard on the mastoid but C_{512} and C_{64} and C_{32} are. There is much scarring of the posterior wall of the pharynx which is said to be the result of scarlet fever when a child.

DISCUSSION.

Dr. W. Hill: The interesting feature here is the abnormally forward position of the sinus. I think it is just under the field of operation when removing the posterior wall of the meatus. I once operated upon an exostosis by a post-auricular incision, and I only dealt with the excrescences of bone, as I supposed it was a hyperostosis. After using the chisel, there was very profuse hæmorrhage from the lateral sinus. I packed it with gauze, and it all healed up without troublesome sequel, until the man came again with a repetition of the hyperostosis. I had told him it would not recur. I used a burr and took the bone away from the roof this time, and there was no further trouble. The sinus in that case was on the bone.

Mr. W. M. Mollison: I hope it is not suggested that if cholesteatoma is found no operation may be needed; only when there is such a large hole as in this unusual case, can one scrape out the cholesteatomatous cavity through the meatus? I showed a somewhat similar case, in which a cholesteatoma had performed the radical operation but had eventually caused suppuration and formed a sinus by ulcerating through the mastoid; it had also exposed the dura of the middle fossa and the lateral sinus and had caused a fistula in the external semicircular canal. It would not be safe to leave that case without operating, even though drainage through the meatus was very free.

Mr. SYDNEY SCOTT: This is an excellent example of a cure resulting from Nature's method of performing the radical mastoid operation. Mr. Mollison showed us a similar case some time ago and we meet with others occasionally, but Nature's ways are so slow and uncertain that I feel we are justified in adopting the more expeditious methods of the surgeon which aim at attaining the same result.

Lieutenant-Colonel P. GOLDSMITH: I recently operated upon a temporo-sphenoidal abscess. The man had been operated upon some time before, in France, and very few notes were made on the case. On opening the mastoid on this second occasion, the lateral sinus was found far forward, and the antrum had not been opened at all, and the greater part of the disease was inside.

Dr. WYLIE: I differ from Mr. Somerville Hastings in regard to this case, because I believe it requires to be opened up behind, and looked into. It would then be found there are many cells, filled with cholesteatomatous matter, and overhanging edges of bone. Unless this is carefully cleaned out, it will re-form in two or three months.

Professor URBAN PRITCHARD: I suggest for use in such cases as this the little sideway syringe which I showed here some time ago. It clears out these cavities thoroughly.

Mr. SOMERVILLE HASTINGS (in reply): I believe this case has not been touched for three weeks. I saw it for the first time three months ago, and I wrote asking the patient to come to the hospital, with a view to showing her to the Section, three weeks ago. I then cleared away a little débris, but nothing has been done to the ear for the last three weeks, and to-day the ear is quite clean as you see. I think it would be meddlesome surgery to do anything to the ear as it is now, for no operation would improve the condition. The ear requires clearing out every few months, but so does an ear after a mastoid operation. I still feel that this is one of the few cases of cholesteatoma which need no operation.

(*November* 16, 1917.)

Case of Complete Deafness and Complete Loss of Labyrinth Function; ? Cause.

By W. M. Mollison, M.C.

This man, aged 21, was in the Army till eighteen months ago when he began to be deaf. He was a driver in the R.F.A. He underwent a mastoid operation on the right side in a military hospital; since then there has been slight right-sided facial paralysis. Examination of the ears shows the right meatus somewhat narrowed as a result of the operation, the scar of which is seen within the hair margin behind the mastoid. The tympanic membranes appear normal. Deafness seems to be complete both for air and bone conduction. The man speaks as though quite deaf. He says he could hear the guns during recent air raids, but he probably only felt the concussion. Similarly he states that he can hear a loud fork placed on the head, but he "hears" it equally well if placed on his hand. The labyrinth appears functionless. Syringing with cold water for some time produces no sensation of giddiness, nor does any nystagmus result. Rotation in a chair similarly fails to produce vertigo, nystagmus, or pointing error; after fifteen turns the patient could walk well except for one slight stagger, which may have been due to stepping off the chair after having the eyes closed.

DISCUSSION.

Mr. Mollison: The loss of function in the labyrinth is not complete, and I take it his deafness is probably functional. The question then arises how to restore that function. I saw yesterday a girl who had been injured in an air raid. She was deaf in the right ear, though to external examination the ear appeared to be normal. She could not hear conversational speech close to the ear. I syringed the ear and produced labyrinth reaction, and suggested she would hear, and she did. I tried the same treatment on a wounded officer who had been shot through from in front of the right ear, and the missile came out in front of the left ear. He is absolutely deaf, but to external examination his right ear is normal. He had a very good caloric reaction in the right ear.

I suggested to him that he would improve, but there is so far no improvement. Later, suggestion under light ether anæsthesia failed to cause any response.

Mr. J. F. O'MALLEY: I had two cases of functional deafness, in neither of which was there any lesion. They were patients who had undergone very severe exposure to shelling in the trenches, and the men were taken back totally deaf. I was able to get each of them to hear quite well in a few minutes. I had a large vessel of cold water, and ran the cold water down in the ordinary way into the ear until very profound vestibular disturbance resulted, and after that I shouted loudly down a large speaking-tube, then conversed in the ordinary way, and they answered me. The vestibular disturbance was carried out until a profound response was elicited.

Mr. SYDNEY SCOTT: Methods somewhat similar to those mentioned by Mr. O'Malley are adopted at the National Hospital, where we see patients with different forms of war deafness, injuries and neuroses. Anomalous responses to hearing tests occur similar to those described to-day by Mr. Mollison and Mr. E. D. D. Davis, for I suspect Mr. Mollison's patient so far as his left ear is concerned. He has a genuine defect in the right ear, and probably this suggests deafness in the other. Whether he persuades himself he is really deaf or whether he is only trying to persuade others that he is "stone deaf" I do not know, but I should feel greatly surprised if he could not be cured by the methods referred to. We have probably all seen numerous cases of "stone deafness" due to war conditions completely cured. Recently a young pensioner who had been drawing a pension for deafness for fifteen months was cured in as many minutes, so that he could hear a whisper at 20 ft., and stated he wished to "rejoin the Army and go out to his 'pals,' some of whom were still out there." This man had a fine physique, and had been awarded a medal for bravery on the field; he had been blown up, and afterwards experienced the symptoms attributed to shell shock. He became "stone deaf" in both ears, and had begun to lip read. The drums were intact. He said he heard nothing by air or bone conduction. But his vestibular tests showed that the vestibular nerve was intact. Moveover he varied the loudness of his voice when reading aloud if the noise machine was introduced into the ear. Such inconsistency is common in these neuroses (and malingering may be a form of neurosis). We were justified by the result, in suspecting this man, in spite of his bravery and fine physique, of not having genuine deafness. We assured him he would be cured, and he readily yielded to loud whistles, speaking tubes, and a little faradization.

(*November* 16, 1917.)

Myiasis of the Ear—Larva of the Flesh Fly.

By E. B. Waggett, M.B., Major R.A.M.C.

This is the only case of myiasis of the ear I have heard of during twenty-three months' campaign in Macedonia. It occurred in a Greek muleteer who was sent to the field ambulance on June 4 for removal of aural polypi. He had been treated by syringing for three days. On admission the patient was in great agony. Examination showed discharge from the right ear, which was blocked by some smooth pale objects. Two larvæ, one dead and one living, were removed with forceps. A deep circular ulcer about the size of a threepenny-piece, with pouting, undermined edges, was present on the posterior meatal wall and half an inch from the membrana tympani. The latter showed a small perforation near the centre. Relief was immediate and healing rapid.

I subsequently learnt through the interpreter that the patient had had a slight discharge from the ear following an attack of earache a month previously. Five days before admission he was awakened from his midday sleep in the Struma Valley by the presence of a fly in his ear. This escaped. Pain persisted and he woke at 2 a.m. next morning in great pain. Vertigo was present, but no deafness. He heard the sound as of a watch ticking in his ear. Severe pain persisted until the date of his admission; this was worse at night and not paroxysmal.

The living larva measured $\frac{8}{10}$ in. in length and exhibited such amazing vigour and activity that its mere presence in the ear must have caused intolerable distress. The growth reached by the larvæ in the course of five days explained the size and depth of the excavation in the meatal wall. For two days the creature ceaselessly raced round the glass vessel in which it was imprisoned, taking no notice of raw meat supplied for its nourishment. At the end of two days it pupated, burrowing into a ball of moist blotting paper in preference to a lump of meat and a roll of dry straw put there for its choice. At some date between August 7 and September 12 the imago emerged—that is to say, after a period of pupation not less than eight weeks and not more than thirteen weeks. The larvæ were of the ordinary acephalous type, tapering to a point in front, without whorls of hooklets as in the screw worm. I enclose the pupa-shell *in situ* and the adult specimen of flesh fly, *Sarcophaga carnosa*.

(*November* 16, 1917.)

Gastro-intestinal Sepsis, a Cause of Ménière's Symptoms.

By T. Mark Hovell, F.R.C.S.Ed.

Since Ménière's paper was published on February 9, 1861, dealing with a set of symptoms produced by hæmorrhage into the labyrinth, and consequently producing an incurable form of deafness, this set of symptoms, with which his name has been associated, has conveyed to the medical prefession at large the idea of a condition of the ear for the relief of which but little can be done.

Although aural surgeons of late years have clearly drawn the distinction between Ménière's disease, or the class of cases to which Ménière referred in his paper, occurring suddenly in patients without previous ear trouble, and Ménière's symptom-complex occurring in patients suffering from an affection of the middle ear—which condition for many years past I have preferred to call by the simpler term of Ménière's symptoms—the distinction is not as yet universally understood in the profession, and there is in consequence a tendency, except with aurists, for any patient suffering with the group of symptoms which Ménière described, to be regarded as having an incurable ear disease, and, therefore, for it to be thought that all that can be done is to give palliative treatment and hope that another attack may not soon occur.

It is my intention to confine myself now to the cases in which the symptoms occur in patients suffering from middle-ear disease, and come on without the reason being apparent, and not to deal with those in which the symptoms result from a procedure which obviously produces them, or a condition in which it is well known that they occur. Amongst the latter may be mentioned, syringing the ear when perforation of the drum-head exists, quickly rotating the patient, an extension of suppuration to the labyrinth, such as is found in the course of acute disease from inflammation or infective processes extending to it, and the attacks of giddiness and tinnitus which occur sometimes as part of the vasomotor diseases which accompany the menopause.

Having noticed a similarity in the general condition of patients who become affected in this way, I began to pay close attention to the matter, and finding that the treatment adopted not only greatly diminished the frequency and severity of the attacks, but in some cases practically freed the patients from this distressing condition, I consider it only right to bring the matter forward so that a larger experience may be obtained.

Many of the patients whom I have seen had the following conditions present at the first visit: a furred tongue, congested pharynx, nasopharyngeal catarrh, hypertrophic rhinitis, flatulency, frequently causing a considerable amount of distension, and constipation, although sometimes the motions were broken and light coloured. Several patients have told me that previous to an attack the motions have been noticed to be especially offensive. With these symptoms present it did not surprise me to find the blood-pressure often, although not invariably, high, for toxæmia due to intestinal sepsis is a common cause of increased blood-pressure, and, as might be expected, some dilatation of the heart often existed, although this symptom was not always present. I say, "as might be expected," for a common cause of cardiac dilatation is increased blood-pressure resulting from intestinal sepsis, and therefore some cardiac dilatation frequently exists, although often overlooked on account of its producing no audible symptoms or marked physical disability unless existing in a marked degree.

It is not customary to habitually examine the size of the heart by gently percussing the chest wall whilst a stethoscope is held against it; if this were done the transition of sound from clear to more dull, indicating that the cardiac area had been reached, could easily be appreciated—as I have often heard it whilst my patient was being examined by the physician whom I had requested to ascertain the condition of this organ,—and dilatation would be found to be far more often present than is now generally supposed.

Although I have only mentioned the toxæmia due to intestinal sepsis, oral sepsis due to pyorrhœa, decayed teeth, crowns or bridges must not be overlooked, or any other conditions which might tend to produce this result.

With the patient in the state which I have described it is not surprising that closure of the Eustachian tubes is usually present when Ménière's symptoms exist, for, as I have many times pointed out, gastro-intestinal derangement is a common cause of congestion of the pharynx and nasopharyngeal catarrh, and consequent closure and catarrh of the Eustachian tubes. Nor is it to be wondered at that tinnitus and giddiness are found when toxæmia is present, these symptoms being more the result of this condition than caused by high blood-pressure when it exists.

With the condition present which I have described it is obvious that in many instances it would add materially to the comfort of the patient if the set of symptoms known as Ménière's symptoms were to convey in the first instance the impression of the existence of gastro-intestinal derangement, rather than as at the present time, an incurable condition of the ear; for with the former basis thoughts would travel to gastro-intestinal antiseptics, medicines for reducing blood-pressure and correcting digestive derangement, and to the advisability or otherwise as a preliminary measure, of washing out the stomach with an alkaline solution in the usual manner by means of a funnel attached to a flexible rubber tube. In some cases I have had a specimen obtained from the stomach during fasting and a vaccine prepared and administered as an adjunct to other treatment.

With regard to blood-pressure, I may mention in passing that a solution of adrenalin chloride taken internally is by many supposed to increase blood-pressure, but in reality a small dose reduces it, and 3 to 5 drops, with a little dilute hydrochloric acid and appropriately flavoured, makes a pleasant and useful mixture; but no medicine given with the object of reducing blood-pressure will obtain satisfactory results unless the intestinal tract is restored to a healthy condition, and as a first step to medicinal treatment I am in favour of a full dose of castor oil.

Although the removal of the cause is essential for the successful treatment of the case, local measures must not be neglected, as they also give material relief to the patient, and the most important of these is to restore the patency of the Eustachian tubes. In many instances the mere injection of air into the tympanum lessens the distressing symptoms, but I find that for permanently restoring the patency of the Eustachian tubes the injection into them through a catheter of a few drops of collosol argentum is often shortly followed by a beneficial result, and I know of no drug which more quickly produces this effect. Obviously the nozzle of the syringe which injects the drug into the catheter must not fit the catheter tightly, as in this case the drug might be forced directly into the Eustachian tube instead of being sent into it in the form of a spray by air pumped from an air bag, the nozzle of which closely fits the catheter.

To lessen the nasopharyngeal catarrh, collosol argentum or collosol iodine is useful, sprayed directly backwards through the nostrils by an all glass, or vulcanite spray producer, so that it reaches the nasopharynx and the orifices of the Eustachian tubes.

I take this opportunity to mention that the injection of a few drops of collosol argentum, or in some cases, of collosol iodine, into the Eustachian tubes with the object of restoring their patency not only applies to patients suffering with Ménière's symptoms but to closure of the tubes to Valsalva's inflation due to any cause. I have had many instances in which this treatment greatly relieved, and in many cases removed, tinnitus when closure of the tubes existed, although in many of them the patient was suffering from incurable deafness due to sclerosis or other conditions. Whether in this case the tinnitus is due to a congested condition produced by long continued closure of the tubes and the mere restoration of the patency by removing this, causes the tinnitus to subside, or whether it is due to the tissues being affected by the drug, I am unable to say. The result, however, is most satisfactory, for, as we all know, patients frequently say they do not mind the deafness but it is the tinnitus which causes their life to be almost unbearable, so that this simple method of removing the trouble, often in old standing cases, is worth remembering, as tinnitus has always been a difficult symptom to get rid of, and even the more troublesome treatment by ionic medication when this gives relief, is not always followed by its complete removal.

I have found collosol argentum also useful for stopping earache and usually apply it for this purpose by placing the patient with the meatus of the affected ear upwards and then filling it with the drug and allowing it to remain there.

Speaking of collosols, I may mention that I have been told that collosol iodine or collosol mercury should not be given in conjunction with arsenic as iodism or mercurial poisoning respectively quickly follows this procedure. I have had no experience of the result of these drugs being administered together or in close succession, but think it well to call attention to this matter.

In conclusion I can only express the hope that the success which I have found to attend the treatment of the class of Ménière's symptoms which I have described, may be of use to others, and thus tend to relieve and even permanently remove the distressing condition from which these patients suffer.

DISCUSSION.

The PRESIDENT: There is no doubt that in some cases with Ménière's symptoms if the blood-pressure is reduced symptoms are arrested, and I think that fact is thoroughly well realized, as in some cases, if one prescribes nitroglycerine or nitrite of amyl the attacks cease. An important part of the treatment is to put the patient to bed and not let him move. Nothing reduces high blood-pressure quicker than rest.

Dr. ALBERT GRAY: I agree with Mr. Hovell as to the importance of increased blood-pressure, but I should have been more interested to have heard about the cases in which the blood-pressure is below the normal, for that is a more common cause of Ménière's symptoms than is high blood-pressure. I refer to disturbances in persons in low health, and whose vasomotor system is, apparently, in a very unstable condition, patients who flush and become pale readily, and have attacks of giddiness. To such patients I have sometimes given suprarenal extract. They seemed to improve under it, but I have not attributed too much to the extract; the change is due rather to the improvement in general health. It is more easy to raise a low blood-pressure to normal than to bring down high blood-pressure, especially late in life, when patients are of the age when arteriosclerosis is apt to occur. These cases are more frequent during war time, especially when there have been sleepless nights and a wearing anxiety.

Lieutenant-Colonel P. GOLDSMITH: There is one type of case which is associated with what is understood as small hard kidney. If you take cases of men and women over 45 years of age who have tinnitus unassociated with middle-ear trouble and you examine the urine, you will find in a large number of the cases not necessarily albumin, but granular and hyaline casts. In those cases the blood-pressure is raised; at all events, it is so later on. In that type of case, the lowering of the blood-pressure will improve the tinnitus: but, as time goes on, the tinnitus will recur unless care be exercised in regard to diet. In private practice it was my invariable rule, in these cases, not only to take the blood-pressure reading, but also to do a microscopic urine analysis.

Professor URBAN PRITCHARD: We must not forget the most common type of cases, the epileptiform cases of Ménière's vertigo; in these there is no middle-ear trouble at all. Many are apt so rush to the conclusion that the symptoms are due to the middle ear. In a large number of epileptiform cases the symptoms wonderfully improve upon the patients taking bromides, or hydrobromic acid, in large doses. There are a certain number of cases in which care in regard to feeding has to be exercised, but in the class of case to which

I am specially referring, it is a great mistake to reduce the patient's condition, because that will increase the tendency to recurrence. In some cases of Ménière's disease one finds that these symptoms existed ten years ago, and afterwards disappeared; the return synchronizing with a lowering of the general health. The dose of hydrobromic acid required by these patients is 40 minims, well diluted. I find 10 or 15 minim doses are of very little use.

Mr. HERBERT TILLEY: I agree with Dr. Gray that these cases are not always those with high blood-pressure. I am not referring to cases of classical Ménière's disease, but to those of the type we are frequently seeing at the present time, in which patients cannot follow their employment on account of mild attacks of giddiness, associated with tinnitus and some deafness. The worst case of this type I have seen was one in which I failed to relieve the patient with bromides or with small doses of quinine, but there was great, and I think permanent, relief from the administration of small doses of ergot—i.e., 30 minim doses of ernutol. Whenever an attack threatens, this patient takes a few doses, and it acts very well. These cases seem to be extraordinarily frequent just now. In pre-war days if one saw four to six cases in twelve months in private practice one felt that it was about the normal proportion in aural practice. Now, however, I am seeing at least two or three cases every week, the slight vertigo and tinnitus being the chief symptoms. Whether it is due to the war, or to the raids, I do not know. There is a large increase of them in hospital practice also: I saw three in my clinic this morning. Professor Pritchard has referred to the good effect of large doses of hydrobromic acid. I have found the combination recommended by Hughlings Jackson excellent—namely, 5 gr. iodide of potassium, 10 or 12 gr. bromide of potash, in 2 dr. of the syrup of glycero-phosphate. Whether the iodide lowers the blood-pressure I cannot say, but it is a sheet-anchor in the present type of mild case, which is nevertheless severe enough to make the patient feel unsafe in getting about. When the tinnitus is troublesome 15 minims of tincture of jaborandi is a useful addition to the above prescription. The associated deafness is the symptom of which it is most difficult to get rid, and in many cases it appears to be intractable to any form of treatment.

Dr. W. HILL: Lake, in his lecture at Boston, laid it down that in these cases in which there was vertigo, although the patients were deaf, there was no obvious ear condition. He said the best way was to separate the cases, leaving a residue with not much wrong with the ear. Those with high blood-pressure require calomel and bromides, those with low blood-pressure need ergotin. At St. Mary's the physicians send vertigo cases to me if the patients are deaf. Some are obviously cases of *petit mal* in deaf subjects, and should come under the care of the ordinary physician. I send my vertigo cases of this indeterminate class to the physicians, trying to persuade them that the cases are of a cardiac and gastric nature: but I have never succeeded for long, and I take it that, as they come back, the medical treatment must be disappointing. The worst case of tinnitus I have ever had was in a gentleman whose Eustachian tubes I bougied, because he had obstruction. One day he could not come to see me, and I went to see him. His doctor had a craze for washing out the stomach, and it was agreed it should be done, as the patient was a dyspeptic. It was done, and there was no return of the symptoms. I procured an apparatus and decided to wash out the stomach in these cases, but I have not known another case in which it has done any good.

Dr. KINGSTON BARTON: Speakers have been laying stress on the tinnitus in these cases, but in general practice my patients ask for treatment for the vertigo, as it is that which specially distresses them. The method thirty years ago was to give large doses of quinine, which made them very deaf, and then they got well. To-day, when vertigo is the most marked sign, the bowel is generally at fault, and there is very great benefit from calomel, sulphate of soda, or Gregory's powder.

Mr. SYDNEY SCOTT: I should like to emphasize certain features of Ménière's symptom-complex which I have never heard dwelt upon in previous discussions. Like Dr. Hill I have sometimes repudiated cases labelled aural vertigo by the physicians, simply because, at the time of examination, between seizures, the hearing and vestibular reactions were normal. I have since learnt I was wrong, and I am not quite sure whether, as otologists, we all realize that in the great majority of cases of vertigo there is a defect of one or both Eustachian tubes at the time of seizure, the labyrinths being free from disease though disturbed by the abnormal conditions in the middle ear. And do all of us realize that some cases of vertigo are unaccompanied by deafness, and yet are due to unilateral Eustachian obstruction? We know, as a fact, that in Eustachian obstruction the hearing for certain tones is sometimes hyperacute. An example of this type was that of an airman, who had been flying in France for several months when he experienced dizziness and unilateral earache for an hour or two after having made a descent from 11,000 ft. in ten minutes. When he felt well enough to fly again, on rising to 9,000 ft. he experienced distress in the right ear and started to descend; at about 4,000 ft. he felt well again and reascended, to find the symptoms return. He abandoned his flight, and on landing felt the unilateral earache and dizziness he had noticed on a former occasion. He was seen by an Army aural specialist, who, finding the hearing good for voice and watch in both ears without inflating the ears, returned him to head-quarters fit for duty. But the airman experienced the same symptoms during his next flight. On each occasion he was free from distress at about 4,000 ft. When I saw him he was not deaf, but said the right ear felt abnormal. The tympanic membranes were intact, but the right membrane was displaced inwards, the handle of the malleus being fore-shortened, and more oblique than usual on comparison with that of the other side. Moreover, the right membrane was hyperæmic.

HEARING TESTS.

R.	*Tone Range*	*L.*
16 d.v.	(*a*) Low limit (Bezold fork)	16 d.v.
	(Sound painfully loud in the right ear in comparison with the left.)	
13·5 cm.	(*b*) High limit (steel monochord) length of wire emitting highest audible note	12 cm.
—	Weber's test with Bezold A fork 118·75 d.v. per second	Referred to the left
2 ft.	Tone acuity for watch	3·5 ft. (normal)
−3 seconds	Tone acuity for fork (4,096 d.v.)	normal

During the patient's efforts to auto-inflate the ears the left membrane could be seen to move, but the right remained immobile. After catheterization the right membrane was restored to its normal attitude, and the hearing tests were perfectly symmetrical, that is, the hyperacuity for low forks disappeared, there was no lateralization in response to Weber's test, the acuity for watch and fork, 4,096 d.v., was equal, and the patient lost the discomfort he had previously noticed in the right ear. I think we shall agree that this officer was merely suffering from unilateral Eustachian obstruction, and that was sufficient to lead to vertigo without deafness. As otologists, it seems our place to emphasize the importance of this relationship, particularly, perhaps, at the present time. I should not like Mr. Hovell to imagine I am trying to belittle the importance of the toxic theory. I should be wrong if I did not admit the probable presence of toxins in the system in certain cases of vertigo. Possibly such toxins would render the nervous mechanism more susceptible to labyrinthine impressions. As to labyrinthine hæmorrhage being a common cause of Ménière's symptom-complex I agree it is among the rarest. I have said elsewhere there are reasons for believing Ménière's classical case to have been one of infective labyrinthitis, with serous meningitis following it,[1] and not a case of simple hæmorrhage.

Professor URBAN PRITCHARD: In the case of a highly sensitive person in regard to the internal ear, the least obstruction in the Eustachian tube will produce the symptom, and in those cases there is practically no deafness.

Dr. DUNDAS GRANT: I was impressed, many years ago, in reading the accounts of a number of cases of Ménière's disease recorded by Sir Stephen Mackenzie in which the ears had been examined by Mr. Mark Hovell, and he found that in most cases there was Eustachian obstruction. He touched the right chord at that time. Often there are two elements in these cases: there is the mechanical, produced by the tension in the middle ear, and the sensory, due to hyperæsthesia of the vestibular nerve or centres. The mechanical element depends upon this, that the annular ligament, the fenestra ovalis and the fenestra rotunda, act as safety-valves for alternations of pressure in the internal ear. If these are tightened up, whether by sclerosis or the tension caused by the indrawing of the membrane by exhaustion of air, the safety-valve action is lost, and the slightest difference of pressure in the internal ear exerts its full effect on the hair cells, so that vertiginous symptoms ensue. If the nerve is very sensitive this may occur with very little tension in the middle ear. If it is heightened from the presence of toxins, or neurasthenia, very slight Eustachian obstruction will produce it. The condition which is most likely to cause it is something analogous to arteriosclerosis, when there is insufficient compensation in the circulation. Then, if there is no safety-valve action in the fenestra, vertigo is inevitable. Probably much of the vertigo in many of our cases is due to an inequality in the action of the labyrinth on the two sides. I made some experiments, which will stand repetition, with regard to that point. I have long found that in aural vertigo, especially if it be due to the throwing out of gear of one labyrinth while the other remains uncompensated, a small dose of quinine, or salicylate of soda, has an extraordinary effect in quieting the vertigo. To discover the reason for this I tested the sound labyrinth by the hot-air test for inducing nystagmus. I found that when the quinine had been given, it required a much longer action of the hot air to produce nystagmus in the sound side. I concluded that the vertigo was, to a considerable extent, due to the over-action of the healthy labyrinth. It may be taken as a general rule that when the vertigo is due to latent epilepsy, it is relieved by bromide of potassium; when due to arteriosclerosis, by iodide of potassium; when due to injury, I have seen it constantly relieved by perchloride of mercury. When it is due to irritability of the vestibular nerve, minute doses of quinine will produce a beneficial effect. I look upon the behaviour under quinine as being almost the touch-stone as to whether the vertigo is of aural origin or due to epilepsy, because, as neurologists will tell you, it is an important distinction, and one which in certain cases it is extremely difficult to determine.

---

[1] *Arch. of Otol.*, 1908.

The PRESIDENT: There is a great difference between Ménière's disease and Ménière's symptoms as described by Mr. Hovell. Ménière in his paper—I think in 1861—described the case of a girl who caught a chill at her menstrual period. She became deaf in both ears, accompanied by severe tinnitus, vertigo and irremediable vomiting, from which she died. Nothing post-mortem in the brain and spinal cord was found to account for death, but when the temporal bones were examined the semicircular canals on each side were found to be filled with blood and fibrinous exudation. From this case and several others like it he described the picture of a distinct acute disease characterized by bilateral deafness, vomiting, tinnitus and vertigo, due to labyrinthine hæmorrhage. This is Ménière's disease, and the term is not applicable to symptoms of chronic affections of the middle or internal ear such as we so often see. A few months ago I saw a case which made an impression on me. The patient was an officer who was sent to me as a "case of

Ménière's disease." On several occasions when turning round suddenly at the head of his battery to give commands, he fell off his horse and was sick and giddy for two hours. I attributed the vertigo to his aural condition, for he was deaf as most gunners are. He rapidly developed marked symptoms of tabes, from which he died, and doubtless his symptoms from the commencement were central and not aural. This possibility should be borne in mind.

Mr. E. D. D. DAVIS: After reading Lake's paper, I took the blood-pressure of many cases of tinnitus, and found it varied from subnormal to supernormal. I could not establish any relationship between the blood-pressure and the tinnitus. I find the treatment of the tinnitus of otosclerosis very unsuccessful. Major Waggett and I have used collosol argentum for antral cases, but we both found even a 2 per cent. or a 4 per cent. solution caused pain and increased secretion of mucus, so I gave it up, and resumed boracic lotion, which is quite as good as collosol argentum, and of course cheaper. I ask whether anyone has had success in treating the tinnitus of otosclerosis.

Mr. MARK HOVELL (in reply): I have had cases in which the blood-pressure was high and others in which it was low, but neither Dr. Gray nor Mr. Tilley, who referred to this, said anything about the condition of the digestive tract. I think in their cases that probably the digestive system was out of order. In answer to Dr. Urban Pritchard, I am aware that he published a most interesting paper in conjunction with Mr. Lake and reported some cases which were of an epileptiform type, and for those, doubtless, bromide is a remedy. In answer to Dr. Kelson, in most cases occurring in excessive tobacco smokers there are digestive disturbances, in fact tobacco causes toxic symptoms. I am glad Mr. Scott found nasopharyngeal catarrh in the cases he referred to, for I have usually noticed that catarrh is secondary to gastro-intestinal irritation, and that local remedies in addition to general treatment succeed, when local measures alone have failed.

Section of Otology.

President—H. J. Banks Davis, M.B.

DISCUSSION ON "THE INFLUENCE OF DISEASES AND ABNORMALITIES OF THE NOSE ON THE EAR."[1]

Dr. William Hill.

Aurists writing in the earlier decades of the last century never mentioned diseases of the nose in their papers and text-books on aural medicine and surgery. It was not until nearly the middle of the century that nasal lesions were occasionally alluded to in a half-hearted way by otologists as having some ætiological relationship to diseases of the ear accompanied by deafness. Anterior rhinoscopy was neither practised nor alluded to; and though posterior rhinoscopy was often mentioned it could rarely have been practised or, at all events, could rarely have been expertly employed, else the condition known as adenoids could scarcely have eluded observation until when well on in the sixth decade. It is true that some years earlier Toynbee had discovered and described the cavernous structure of the inferior turbinal bodies, but, like his contemporaries, his excursions into the domain of nasal therapeutics were limited to the employment of rhinal douches, which were prescribed more with the idea of removing catarrhal secretions from the mouths of the Eustachian tube than from any deliberate intention of treating catarrh in the nasal cavities proper.

---

[1] At a meeting of the Section, held February 15, 1918.

Of course the "man in the street" recognized then, as he does to-day, that an ordinary acute cold in the nose, and likewise the acute nasal catarrhs, associated with the exanthematous fevers and other conditions, were frequently associated with deafness. The otologists of that day, however, as to-day, knew that this was not really a case of cause and effect, as the incidence of acute catarrh falls on both the ear and the rhino-pharyngeal tract without any necessary sequence, and it was only towards the middle of last century that it began to be suggested that the case of chronic catarrh was not on all fours with the acute catarrhs. Hinton mentioned in 1854 that Lucæ of Berlin had suggested that obstructive rhinitis affected the ear by rarefaction in the post-nasal space. The recognition of the influence of "adenoids" led many American and European rhinologists, as opposed to the pure otologists, from the seventies onwards, to make wide claims for the influence of nasal disease on the ear, not merely on account of the spread of non-purulent, muco-purulent and purulent catarrhal processes to the tympanum, but also for the effect of nasal obstruction *per se* by the production of negative pressure.

Woakes not only subscribed to these views but added an additional factor—viz., the *reflex* influence of nasal lesions on the ear, the associated nerve area theory as he termed it—acting through the fifth nerve. He made special claims for an alleged form of osteitis of the nasal labyrinth, which he termed necrosing ethmoiditis. These particular views did not prove acceptable at the time, nor have they since been widely accepted by either otologists or rhinologists.

Woakes' further observation that chronic rhinitis led to a sluggish, paretic condition of the palate with accompanying tumefaction and deafness has, however, been regarded by many as one of great importance and in accordance with experience.

This important and controversial subject was very exhaustively and hotly discussed at the commencement of this century—viz., at the meeting of the British Medical Association at Ipswich in 1900, and at Manchester in 1902, and in the correspondence columns of the *British Medical Journal*, following an article by Sir Felix Semon. These discussions nominally centred round nasal *treatment* for middle-ear deafness, but, of course, the ætiological factor was necessarily bound up with the question and was fully dealt with. The net result was to bring out the fact that two divergent schools of thought even then existed—viz., the *separatist* school, who asserted that nasal disease was not a factor of very much importance in ear disease, and the *connexional* school who were convinced that the association was often present, and was almost a self-evident proposition. This latter school again was divided into two groups. One group believed that a certain minor degree of nasal obstruction, *per se*, which fell short of mouth breathing, was a cause of Eustachian congestion and obstructive tumefaction as the result of *negative pressure*, although this group recognized also the factor of *nasal catarrhal diseases* as producing Eustachian stenosis and certain middle-ear changes resulting in deafness. The other group rejected the negative pressure hypothesis, but accepted the catarrhal theory.

The small separatist school held that the nose and the ear were entitled to their separate diseases, and that in fact they were practically entirely independent one of the other. They argued that ear lesions were certainly and admittedly not the cause of nasal disease, and that the converse was equally true. By parallel reasoning it could be pointed out that ear disease is not asserted to be a cause of post-nasal disease, and the separatists were the first to admit that they could not and did not claim that the converse was true as regards the post-nasal space, and some of them recognized that their generalization on logical grounds had to be met when their opponents called their attention to this analogous set of conditions. Analogy is, of course, not a strong argument in logic. Some of the separatists, however, felt that they had to meet this argument to the admitted influence of contiguous disease in the post-nasal space, and McBride, for instance, was forced to suggest that enlargement of Luschka's tonsil (which is admittedly frequently associated with middle-ear deafness, though sometimes not) only affected the ear when the lymphoid overgrowth actually touched the Eustachian cushions! Mere post-nasal obstruction no more caused Eustachian tumefaction than did nasal obstruction, and the negative pressure theory was rejected with contumely. They were in some difficulty, of course, when McKeown recalled attention to the fact that the deafness was often *immediately* relieved after removing adenoids.

Turning now to the *catarrhalist* group of the connexionists. Its most prominent advocates were Lake and Watson-Williams, supported by Law, Hovell, Pritchard, Kerr Love, Bronner, Kelson, Milligan, Tilley, and others. This group, while fully recognizing that many cases of long-standing nasal catarrh, with or without more or less obstruction, did not become deaf, yet on the other hand urged that in a by no means negligible proportion of cases the two conditions were associated, and the frequency was sufficiently great to lead to the conclusion that it was a case of cause and effect. They laid stress on the view that the catarrhal process, with more or less accompanying tumefaction, *spread by continuity* from the nose to the tubes; that, though this sequence was not by any means always observed, yet we must regard any individual case of chronic nasal catarrh as a potential, or at least possible, ear case in the future and take measures accordingly. That in established cases of nasal disease, accompanied by deafness from tubal obstruction, surgical or other measures could justifiably be undertaken on nasal grounds alone, but that if the deafness was relieved by some method of inflation, or by bougieing, then it might be rightly urged that treatment might be expected, not merely to improve the ear condition, but also to arrest the further progress which would be likely in the absence of nasal treatment.

The *pure catarrhalists* rejected the ingenious hypothesis of the negative pressure school or *rarefactionists*. The latter were in general agreement with the catarrhalists as to the influence of various forms of chronic rhinitis on the ear, more especially when there was increased secretion, but, in addition, they held the view that nasal obstruction, *per se*, so long as *it fell short of actually leading to mouth breathing*, gave rise to negative pressure or rarefaction of the air in the nasopharynx and middle ear, resulting in "exhaustion otitis"; and that congestion was followed by tumefaction in the tubes and middle ear with consequent deafness. Scanes Spicer, Dundas Grant, and Baber were prominent advocates of these views.

Lack, with a view to giving "a more definite turn to the discussion," asserted that "nasal obstruction, *per se*, was never a cause of deafness or of ear disease."

His summarized reasons [here quoted nearly verbatim] were :—

(1) The large number of cases met with in which "partial or complete nasal obstruction existed, and had existed for years with normal hearing and normal ears."

(*a*) In anterior nasal stenosis, partial or complete, due to syphilis or to lupus, "it was the greatest rarity to observe any impairment of hearing." (Tilley had pointed out that in bony occlusion of the posterior nares deafness was conspicuous by its absence in all reported cases.)

(*b*) In treating, on a very extensive scale, atrophic rhinitis with gauze packing, entirely obstructing respiration, it "had never produced deafness; on the contrary, occasionally pre-existing deafness had actually improved"!

(*c*) In nasal polypi, even in children, deafness was notoriously rare. "The same held true of nasal obstruction due to deflected septa and spurs." (Lack did not appeal to sinusitis, but it was pointed out by others that when acute otitis followed it was of the nature of an accident due to injudicious hyper-pressure douching and syringing.)

(2) "Growths in the post-nasal space—e.g., adenoids—caused deafness, but here there was no obstruction or negative pressure at the orifices of the Eustachian tubes, the plane of the site of obstruction produced by adenoids being posterior to the orifices of the tubes."

(3) In Eustachian obstruction deafness, he asked, "Why did negative pressure in the post-nasal space exert its influence on the tympanum and membrane when the tube was obstructed and not when it was patent, and how was it that the greater the amount of obstruction of the tube the more marked the indrawing of the drumhead?" "Surely Eustachian catarrh and obstruction, with or without more or less middle-ear catarrh, was the cause of the ear trouble in these cases, and not negative pressure."

(4) "Children with simple nasal stenosis were usually not deaf." (This was in contradiction to Horne and others who, as I think very rightly, asserted that nasal obstruction, apart from post-nasal obstruction, though a sufficiently prominent factor in adults, was a much more prominent factor in children on account of the *relative* smallness of the nasal cavity in them, and Horne also suggestively called attention to the fact that the Eustachian trumpet was on a lower plane in children, and also nearer the floor of the nose, of which it was almost a direct continuation in line. It must be remembered, too, that the tube is relatively wider and shorter in children than in adults.) "Children with adenoids and also adults were often not deaf, but only when the tubes were blocked."

(5) The immediate improvement following adenoid operations might be "better explained by the lessening of the Eustachian obstruction resulting from hæmorrhage than by the negative pressure theory."

It will be seen that Lack and Tilley failed to appreciate the proviso insisted on by the supporters of the negative pressure hypothesis—that rarefaction in the post-nasal space only obtained when the degree of obstruction acting *per se* was a moderate one, and fell short of that which necessitated mouth breathing. The majority of otologists, however, were at one with Lack in rejecting the alleged negative pressure influence in any circumstances.

It should be clearly stated and understood that those who took part in the discussions above mentioned were almost without exception of opinion that *a certain amount of clearly unnecessary nasal operating for deafness was being perpetrated at that time.* A few even thought it was very prevalent, though this was the practice for the most part of certain specialists only who were not represented at these discussions. It was alleged that some enthusiasts went so far as to remove small septal spurs and cauterize the mucosa, with the promise of relief in long-standing middle-ear deafness, and even in cases of otosclerosis with open tubes.

Of those who took part in these controversies in this country nearly twenty years ago, all survive except Baber.

The subject has now come up for review and stocktaking by almost the same seniors again, who will now have the advantage of hearing the opinions of those of our junior *confrères*, many of whom were not practising otologists at the period of controversy early in this century, and the questions are: Does the modern view more or less correspond with that held by the more moderate members of the catarrhalist group? Or, Is expert opinion to-day widely divided? Are there any separatists? And, again, Are there any new aspects of this question?

I think I may conclude that the influence of nasal obstruction *per se* in the absence of accompanying catarrh has few adherents at the present day, and that even the very moderate and plausible claims made by Scanes Spicer and Dundas Grant for the negative pressure factor in moderate degrees of nasal obstruction which fall short of mouth breathing have not caught on.

Although we all of us admit in varying degrees the influence of nasal tumefactive catarrhal factors on the tubes and tympanum, yet the considerable number of cases of various forms of nasal catarrh in which the ears are not distinctly affected require explanation. Is an individual predisposition to catarrh, more especially to aural catarrh, a necessary additional factor in the production of deafness? How else can we explain the number of cases with nasal polypi, a typical catarrhal disease, with varying degrees of obstruction, in which the deafness is so slight as not to be acknowledged by the patient and only demonstrated by careful testing? Is it not a fact that nasal suppurative sinusitis is rarely followed by tympanic suppuration apart from those exceptional cases following operation or the injudicious use of the nasal douche?

Why does the so-called dry catarrhal process, with crusts and fœtor, so seldom cause deafness?

Again the ætiology and pathology of the atonic palate of Woakes, following nasal catarrh, require further elucidation, as does the mechanism by which this condition leads to deafness.

May there not be just something in the associated area theory of Woakes? How are we to explain the occasional rapid relief of tinnitus and vertigo in various ear lesions by nasal cauterization except by this reflex theory? It is alleged that otosclerosis is influenced for the worse by nasal operations and cauterizations. Is not this on the assumption that the ear is *reflexly* influenced for the bad under these circumstances?

In reference to enlargement of Luschka's tonsil: does this affect the tube and tympanum by the spread of tumefactive catarrh or by narrowing of the post-nasal space? What is the explanation of the *immediate* relief of deafness in many cases after the removal of adenoids? Again, is it not a fact that the mere removal of adenoids in children often relieves the accompanying nasal catarrh without any *ad hoc* treatment of the nasal cavities proper?

I hope that we may arrive at some definite conclusions as to when relief of ear symptoms in cases with accompanying nasal lesions can be expected, and when it is not merely justifiable to operate on the nose, but unjustifiable neglect to omit to do so.

Mr. NORMAN PATTERSON.

For clinical purposes it may be useful to regard the middle ear as an accessory sinus or annexe of the nasal and post-nasal spaces, which may be looked at as one tract. The tympanum may be considered as corresponding to the frontal sinus and the Eustachian tube to the fronto-nasal canal. It is reasonable to suppose that infection is carried to the cavities in question along their respective ducts in exactly the same way. A pad of adenoids, or a neoplasm in the nasopharynx may at times play the same part as an enlarged middle turbinate, a polypus, or other swelling in the neighbourhood of the middle meatus. The analogy is further brought out in considering the treatment of inflammatory diseases of the ear on the one hand and sinusitis on the other.

The PRESIDENT read the following letter from
Mr. LAMBERT LACK.

"I am very sorry I cannot be present, as my views seem to have been considered of so much importance. On re-reading they seem to be more reasonable than one would expect after such a long period of years, but I disagree with Dr. Hill's interpretation of them. My opinion is opposed only to a theory of nasal obstruction acting by negative pressure. That nasal catarrh produces deafness I have never doubted, and obviously nasal obstruction produces nasal catarrh or predisposes to it. In olden days we fought a foolish theory of negative pressure which wrought much harm, but perhaps now is dead and forgotten."

Sir STCLAIR THOMSON.

I approach the subject from the nasal side. We should check our observations by noting the conditions of more healthy subjects, as I have done for the last eight years. At Midhurst patients are only submitted to me to see whether there is anything wrong with the larynx, but I have used the occasion to look also at the nose, nasopharynx, and, where necessary, at the ears. In that way I see many patients who make no complaint of nose or throat: and yet I have been struck by the large number of them who have nasal obstruction without aural disease. So I have come to consider that this "negative pressure" theory is, as Dr. Hill put it, quite a "dead donkey." I am inclined to think the trouble is more pyogenic than obstructive, but there, again, we are met with difficulties in these cases of ozæna and sinus suppuration, in which ear disease is not by any means the rule. When I was looking up the matter for my text-book, I investigated the records of all the published cases of patients with congenital atresia of the posterior choana, and it was remarkable that in them deafness or ear trouble was not noted. I operated upon a boy with an enormous nasopharyngeal fibroma, who was a constant mouth-breather because of the blockage, and yet deafness was not marked—and other similar cases have been recorded. Dr. Hill says it is accepted that catarrhal processes in the nose tend to extend to the ear, but I question whether it is as much accepted as that catarrhal affections of the nose extend to the pharynx, or affections of the pharynx to the larynx. We have to bear in mind local resistance and predisposition. I am sometimes asked to give an opinion—either a primary or a secondary one—as to whether a septum should be resected on account of symptoms, and I have seen a number of patients who have been told they have a deviated septum, and that, if it is not operated upon, they will go deaf. That is quite unjustifiable. But if the patient is already deaf, or has had ear attacks, I think it is right to tell the patient that to improve the air passages—if they are open to improvement—is a wise precaution, to preserve the hearing they still have.

The point on which I differ from Dr. Hill is, that a catarrhal process in the nose has not, necessarily, a tendency to extend to the ear. The physiological view is, that the catarrhal process tends to attack both, not of necessity by a process of extension, but that the patient has either a congenital tendency, or a congenital loss of resistance in these two organs ; in other words, he is a catarrhal subject. We know how difficult it is to explain the fact that in some families adenoids will cause one train of symptoms, and in another family another set of symptoms, just as other abnormalities seem to run in families. We ought to take account of the lowered resistance of certain organs in certain people, or a greater predisposition to certain diseases.

Dr. ALBERT GRAY.

The phrase "negative pressure" is not justifiable: one might as well speak of dry rain. Negative pressure is an indication of something which does not exist. The right term in this connexion is "diminished pressure." With regard to individual differences in people who suffer from nasal catarrh, I agree with what Sir StClair Thomson said, and that is the point I try to emphasize. Many individuals suffer from nasal obstruction, and yet only a limited number of these suffer from dullness of hearing. That is one of the reasons why the results of operation on the nose for the relief of deafness are so often unsuccessful. I believe otosclerosis to belong to the degenerative conditions, not to the inflammatory. If there is a nasal condition which may show a tendency to produce deafness, it is not uncommon for the deafness to progress even when the nasal condition has been rectified. Many supposed cases of catarrhal deafness are those in which otosclerosis has also commenced, and that is why we may speak, correctly I think, of mixed cases.

Mr. Charles Heath.

I regard aural catarrh as a constitutional affection, more than as a condition brought about by irritation or obstruction in the nose. Catarrh may and does affect the ear *and* the nose, or the ear or the nose. I have seen patients with no nasal catarrh who yet had undoubted catarrhal deafness. I have seen many cases of operations on the nasal septum which were not beneficial. Yet they seem to be more popular than do those on the turbinal bones. After both anterior and posterior turbinectomy has been done, I have seen the middle portion, which was left, still obstructing. This middle portion seems by many to be regarded as sacred: it must not be touched. A deaf servant in my house, who was a mouth-breather, had also double otorrhœa. I asked Dr. Jakins to remove her inferior turbinals. He said she would probably have a dry pharynx if he did. I replied that it would be dry in consequence of the nose transmitting air when the secretions of the nasal mucosa were diminished. Both her suppurating ears dried up, and the perforation healed as a result of the operation. I have seen other and similar cases. Yet I join Sir StClair Thomson in condemning the custom of promising improvement of hearing by nasal operations.

Dr. Watson-Williams.

Dr. Hill has referred to the attitude I took up in the discussion eighteen years ago, and has characterized me a catarrhalist. My subsequent experience has made me even more so. I reject *in toto* the negative pressure hypothesis, in favour of which I have not heard a sound argument. I believe the influence of septal deflections and adenoids mainly depends on the catarrhal affection which may be associated. The reason of the variation in the results of operation on the septum in cases of deafness depends on the fact that often the nasal obstruction has led to a superadded infection of the nasal passages and sinuses—e.g., after an attack of influenza. In such a case the determining cause of deafness may be the septal deflection, if the deafness is due to the spread of that catarrh to the ear. I wish to draw attention to the group of cases in which pain is referred to the ear in sphenoidal sinus disease. Many years ago, I was asked to see a patient, a boy aged 12, who was suffering from severe pain in the ear. I found nothing wrong in the ear, but slight febrile conditions, &c., led me to think he had influenza. I was then more chary of entering the sphenoidal sinus of a boy of that age than I should be now, so I left directions that if he did not improve with palliative measures I should be asked to see him again to explore the sinuses. So severe was the pain referred to the ear, that Mr. Cheatle was called in, with the view of doing a mastoid operation, but he found nothing wrong in the ear. A little later Sir Victor Horsley was called down, when the patient was moribund, and it was thought to be cerebro-spinal meningitis, but the cause was not diagnosed. The post-mortem examination revealed cavernous sinus thrombosis, which the practitioner, Dr. Hubert Wilcox, thought was due to the sphenoidal sinus infection.

With regard to the general relationship of nasal catarrh to diseases of the ear, excluding nerve affections and those due to meatal conditions, such as new growths, syphilis and tubercle, I conclude that in most cases the aural affections are catarrhal—i.e., infective—and that in a great proportion of them the original source of the infection is the nose and naso-pharynx, either from rhinitis or nasal sinus infection, or it may be from infected adenoids. How far otosclerosis is due to toxic absorption from an infected ear is too much of an open question for discussion to-night. But I want to emphasize the frequency of a *latent* sinus infection, sometimes non-purulent, especially of the sphenoidal sinus, as the real source of otitis media. A young man, aged 23, was brought to me by a practitioner who had been treating him for subacute mastoiditis of some weeks' duration. But he had supra-orbital neuralgia also, and he was found to have frontal sinus suppuration, and suppuration of the maxillary antrum. After I had operated upon the maxillary antrum and the frontal sinus, the whole condition cleared up and he went out to the Front with a sound ear. Since then I have been more consistent with my exploration of sinuses in cases requiring mastoid operation, and now I do not do that operation without first exploring the sinuses, by means of the suction syringe, which occupies one minute. It is astonishing with what relative frequency one finds the sinuses affected. Recently I had satisfied myself, in a patient upon whom a mastoid operation was to be done, that there was no sinus infection, but on exploring, I found in one maxillary antrum a considerable amount of muco-pus: I made a pernasal opening and drained, to avoid having my operation spoiled by infection passing up the Eustachian tube to the middle ear. The presence of sinus infections is allowed to rest too much on the actual presence of pus, but a catarrhal secretion, if examined histologically, will often give a valuable clue when there are polynuclears and pyogenic organisms with polynuclears, showing there is active infection in that sinus, though I do not say such a sinus must require operation. If there is otitis media in association with infective sinusitis, they are probably interdependent conditions. Almost all cases of chronic otitis are infective, not necessarily purulent. It may be a dry otitis media, and yet be infective. The result of my more recent observations is that the sinuses are infected in a larger proportion of cases than we have been led to suppose. My experience is, that the more pus there is in the sinus, the less is the likelihood of the infection spreading to the ears. I have seen robust-looking patients with the nose full of polypi and pus, and the copious polynuclear exudation has apparently kept the development of organisms in check. If I am correct, this is the explanation why, in cases of well-marked signs of suppuration with polypoid degeneration one comparatively rarely finds otitis media. In other cases, though the patient is depressed and pale, there is little to be seen. I therefore lay stress on the importance and relative frequency of the non-suppurative yet infective cases of sinusitis, for I fear they are often overlooked.

Mr. Claud Woakes.

It is interesting to hear my father's work referred to by Dr. Hill. I myself follow his methods daily, and with some success. In treating deafness, we must choose our cases, and be careful not to promise a cure of the deafness. The word "cure" is not in my medical vocabulary. I tell patients I shall probably give them relief if I remove what is causing the trouble. When I see a Eustachian tube which is not functioning, whether due to obstruction in the nose, or pressure, or ethmoiditis, I treat those conditions, and then open the Eustachian tube by the ordinary method, with a bougie, and the results I have had have been fairly satisfactory.

Professor Urban Pritchard.

I gathered it was said that the pressure of adenoids, by blocking the Eustachian tube, did not produce deafness. Still, we know that on the removal of adenoids the improvement in the hearing is often immediate.

Some say it may be due to the hæmorrhage, but I do not believe that at all. I remember one case in which the patient had suppuration of both ears, and could only hear at ½ in. a 50-in. watch, and immediately after coming out of the anæsthetic after the removal, the hearing was normal. Why that was so I never could tell. In patients with bad suppuration I do not at once remove adenoids, but prefer to purify the middle ears as well as I can. When the suppuration is practically at an end, I remove them. The removal of adenoids in the presence of suppuration has produced mastoiditis.

With regard to the previous discussion, and the operations on the nose, we thought they were done much too frequently. I think we all practically objected to removing spurs in cases of otosclerosis. I am very glad Dr. Gray has improved our nomenclature. At Boston I said I wished somebody would invent a good name for otosclerosis, because all that was correct about the term in use was the "oto."

Mr. Mark Hovell.

When there is double nasal obstruction in a case of deafness, it is especially necessary to attend to the nose, and in some cases removal of a spur is beneficial. But much depends on the size of the spur, for it is not necessary to take away the whole of every spur. There should be a free airway through the nose, but many people breathe comfortably through what appears to be an obstructed nostril, as air will pass readily through a tortuous passage, and the sensation of the patient can probably be trusted in this matter.

With regard to the question of adenoids, on which Dr. Hill touched, I have long held very decided views with respect of their recurrence. I used frequently to get recurrence, and one day the friends of a boy upon whom I had operated about two months before, brought him back, saying he was no better and that his mouth was as widely open as before, and, therefore, the operation had not done any good. I knew all the adenoids had carefully been removed, so I anæsthetized the soft palate and on examining the nasopharynx, saw it was quite clear, but that both choanæ were blocked by the enlarged extremity of each inferior turbinated body. After the removal of these with a snare, nasal respiration was fully restored and ever since I have passed a snare as a routine measure to ensure the extremities, if enlarged, being taken away, and since have had no recurrence of adenoid growth. This procedure, I maintain, cannot do any harm, even if there is nothing to come away. It used to be taught that if the adenoids were removed, nasal obstruction would disappear, but the case I have quoted clearly shows this to be an erroneous idea.

Dr. Dundas Grant.

I do not think it is desirable to divide the members of the specialty up into camps. With one or two exceptions, I think that if the members of the various groups were together in consultation in any given case, their opinions would exactly coincide. Dr. Law once told me he was sure the Vienna otologists would have been more successful with their cases if they had been better rhinologists. In one of our former discussions much confusion existed with regard to the diagnosis even of otosclerosis, and reproaches were uttered because one or two people were removing spurs with the intention of curing that disease. They had evidently not been able to diagnose otosclerosis, but would do so to-day. They were probably confused also as to what constituted nasal obstruction. I pointed out in one of our great discussions that even though a nose may appear thoroughly obstructed, we have to ascertain whether there is *actual* obstruction before we operate. It may be said that if there is septal deflection to one side, and a narrowing of that cavity, there is a larger space than normal on the opposite side, and that one large cavity is good enough. But even though there is a large cavity on one side, if the other is obstructed the patient has got the use of only one nostril. It is not a stretching of mechanical mathematics to say that the degree of suction or negative pressure is in proportion to the obstruction, and when only one nostril is useful the space for entrance of air is diminished. It will be generally accepted that an obstruction on one side keeps up a catarrhal condition, but a wide nasal cavity is not a safeguard against catarrh, and the infection may extend along the Eustachian tube. "Negative pressure" is a term we understand, whether it is scientific or not, but it must be taken in its proper perspective. When there is partial obstruction in the nose and the patient is trying to inspire through it, there is a lowering of pressure behind the obstruction. I do not doubt this has in itself some effect in producing vascular tumescence, especially if there is insuction of the *alæ nasi*. The inspiratory dilatation of the thoracic cavity tends, however, to draw the blood into the thoracic organs and diminishes the peripheral vascularity. At the previous discussion an argument urged against Dr. Scanes Spicer's theory was that both nostrils may be full of polypi and yet there may be no signs of tympanic catarrh. His answer was, that in the absence of attempts at nasal breathing there was no negative pressure in the nasopharynx. We have all seen cases in which removal of obstruction has been followed by recovery from Eustachian catarrh: whether it was cause and effect it is difficult to say. No one would now entertain the idea of removing a small spur in otosclerosis and promising good hearing as a result.

Dr. P. G. Goldsmith.

Before one operates upon the nose in a case of deafness, he should have a very careful record made of the degree of hearing. So many people have done operations on the nose and depended on what the patient said afterwards in forming a judgment on the benefit derived. The patient would feel better and brighter as a result of more air going into his head, as nasal obstruction often produces the feeling of dullness and stupidity. The hearing power should also be taken afterwards, irrespective of what the patient's own impressions are. Such a precaution would prevent the occurrence of that kind of case in which young women have had the turbinals and septums operated upon, and the operation for adenoids performed, with the subsequent discovery by another practitioner of commencing otosclerosis, together with a family history of the same complaint. Such procedures tend to bring discredit on the specialty. The question as to why some cases are very much benefited from adenoid operation, while others are not, I do not attempt to explain, but it is noteworthy that while some are relieved temporarily, others do not benefit at all, yet each case is of the catarrhal type. It is possible that one set of cases may have general lymphoid hyperplasia, and so it is conceivable that a tubal hyperplasia is the predominating feature in the cartilaginous portion. In the one set the progress will be fairly rapid, while in the other there will be little or no progress.

Another point is, that in examining cases to see whether the nose should be operated upon, it is the common belief that operating on the nose will improve the hearing. Not always. I think the important point is the permanency of the improvement. I have a record of the hearing taken, then I inflate the ear and re-examine it in about twenty minutes. If the improvement is not maintained, I do not have an operation done on the nose with any idea of affecting the ear; any operation done on the nose is for the nose only.

Accurate case taking will avoid many disappointing results. Careful records of the hearing tests both for diagnostic and comparative records is essential to sound practice. Furthermore, careful records of the progress in improvement is of first importance, since it is of great value in our determining when to *stop* treatment. Over treatment is unfair to the patient, disappointing to the surgeon and patient alike, and for the latter may be disastrous.

Dr. JOBSON HORNE.

When discussing the benefit conferred by nasal treatment on deafness, otosclerosis is one cause of deafness which must be excluded. I do not know of a single case of pure otosclerosis which has benefited by nasal treatment apart from other treatment.

Mr. W. STUART-LOW.

I agree with another speaker that it is a pity to divide those who practise this specialty into sets or camps. Were I to receive a label I think it would be "Sepsisist," because I believe that in most of these cases there is a degree of sepsis present, and that we do not take cultures of the discharges frequently enough. Why do so many instances of marked deafness in the course of nasal catarrh recover their hearing completely? It is because in such cases the catarrh is due to the presence of such simple organisms as the *Micrococcus catarrhalis* as distinguished from septic organisms. But if you find septic organisms in the nose, the patient is liable to have fugitive sepsis of the middle ear, and the repetition of this produces exudative or dry catarrh of the middle ear, and a more permanent form of deafness results. One important precaution, therefore, is the careful bacteriological examination of the discharge from the nose. We have been told that in complete obstruction of the nose there is often no deafness. Why? Because there is no sepsis, but, if sepsis results, the patient will get fugitive attacks of middle-ear sepsis resulting in dry catarrh of the ear. We should operate for this condition if there are repeated attacks, because it will lead to deafness. The cause of repeated attacks—namely, anatomical abnormalities in the nose—should be removed by operation, all forms of nasal obstruction being removed.

Dr. Kelson.

Formerly as senior clinical assistant at hospital for several years I had the opportunity of watching cases after operation, and chronic cases as well, and so of judging the results of treatment better than when only seeing new cases. It is most important to know under what conditions, if any, operation on the nose is likely to be followed by relief of deafness, tinnitus or giddiness. My experience shows that there is a fair chance of some relief, when, with nasal obstruction (1) there is a marked tendency to colds in the head with increase of aural symptoms during the cold ; (2) there is improvement on inflation ; (3) there is improvement after sniffing alkaline lotion up the nose (this is often very striking, but whether by removing mucus or germs, or reflexly, is not so clear).

I shall not refer to adenoids, as they are, strictly speaking, outside the range of this discussion.

Twenty years ago many more minor operations were performed on the nose, especially on either end of the inferior turbinate, but subsequent improvement in hearing was very rare.

Mr. Herbert Tilley.

I can only say that in the opinion I expressed at the British Medical Association Meeting at Ipswich in 1900 I am more confirmed to-day—namely, that obstruction of the nose, *per se*, has no influence in the production of those forms of deafness which are characterized as of middle-ear origin, except in so far as it acts indirectly in maintaining, or in promoting, catarrhal conditions. These are probably of microbic nature, and I believe them to be the cause of the infections of the middle ear which lead to the chronic forms of deafness in which we are interested to-day. I regard the treatment of otosclerosis by the removal of spurs as an illegitimate proceeding. You have only to remember the histological demonstrations of the lesions in otosclerosis which Mr. Fraser, Dr. Gray and others have shown us from time to time to bring such an idea of treatment into ridicule. With regard to the term "negative pressure," I was glad to hear Dr. Gray express himself in disfavour of such ridiculous terminology. Curtis, of America, said we might just as well speak of vomiting as "negative swallowing!"

With respect to the reflex action of nasal disease on the ear, I think I was the first to emphasize this in the discussion on sinus suppuration, at the British Medical Association meeting at Leicester in 1904, when I brought forward a case showing the influence of sphenoidal sinus suppuration in the production of severe earache. The operating table was in the patient's house ready for the performance of a mastoid operation the following morning, but at ten o'clock overnight the lady felt so well that she said it could not be her ear which was at fault, and refused surgical treatment. A few days later she consulted me and I discovered sphenoidal sinus suppuration. We opened the sinus, and she has never had any more ear trouble. There was no symptom in the ear except intense earache, and while this was in progress the pinna was hot and flushed, in marked contrast with that of the other side. Because of that pain it was thought there must be some deep-seated trouble in the ear, for it is well-known that in certain rare cases of mastoid suppuration the tympanum may be intact.

With regard to the question as to what should guide us in determining whether a nasal operation will benefit a case of deafness, my own practice is as follows: If I find a patient's deafness varies from time to time and nasal obstruction is present, and if I find that Politzer's inflation, or the Eustachian catheter, improves the hearing even for a period of twenty minutes, I have not the slightest hesitation in dealing with any nasal disease or structural abnormality. But if I find that inflation of the tympanum has no effect on the chronic deafness, I do not think there is any call for dealing with the nose as a curative measure *qua* the ear. To operate for the nasal comfort of the patient is another matter. I think that is the one test on which we can safely base our practice.

There are many points raised in Dr. Watson-Williams's observations and the views he has advanced seem plausible. But I feel that if our practice is to be based on his conclusions we may be led into many difficulties. If I understand him aright he maintains that one cannot be sure that any sinus is healthy unless the bacteriologist proves its contents to be non-infective. My own instinct would be to rely on my clinical judgment, this being based on the symptoms and the result of my examination, rather than on the report of the pathologist.

Dr. Donelan.

As Dr. Hill says, the term "idiopathic" is applied to diseases of which we do not know the cause and it should not be adopted by modern otologists. I have always understood that negative pressure could exist only in the tympanum and then only from interruption of the normal equilibrium by closure of the Eustachian tube and absorption of the air in the tympanum.

Mr. Stuart-Low rightly says that none of the obstructions mentioned has a permanently injurious effect on the hearing until there is retention of secretion in the nose or its accessory sinuses and septic or other changes occur in the secretion. As to the causation of otosclerosis, the analogy with the occurrence of chronic rheumatic arthritis in sequence to chronic nasopharyngeal inflammations will doubtless suggest itself to many.

The removal of spurs is not likely to have any effect on chronic otosclerosis, but spurs are often removed while gross obstructions at the chondro-vomeral juncture, for instance, are neglected. Where there is marked septal deformity, its correction is to be preferred to the removal of functionally active turbinals. Each case must, however, be treated according to its individual features.

Sir StClair Thomson.

This association of ear pain with sphenoidal sinus disease does occur, and I have carried its proof through to the bitter end in a case in which I did a post-mortem examination. It is published in my paper, "Cerebral and Ophthalmic Complications in Sphenoidal Sinusitis."[1] The complaint was simply of pain in the ear, and the patient was sent to me at an ear hospital, but nothing aural was found wrong. He died of suppuration of the sphenoidal sinus with meningitis. At the post-mortem examination the ear was found intact.

---

[1] *Trans. Med. Soc. Lond.*, 1906, xxix. pp. 12-71.

The PRESIDENT.

The thanks of the Section are due to Dr. Hill for the way he opened the discussion. All the speakers seem to be agreed that catarrhal conditions resulting from nasal obstruction do cause or contribute to the possibility of aural affections, and that in these cases the treatment is obvious. We see such cases every day, and we know that this is true; but whether middle-ear deafness can be relieved or its progress arrested by nasal treatment for real or apparent obstruction when catarrh is non-existent has not been decided at this meeting. Some cases seem to improve—others do not. The question can only be settled by quoting or publishing accurate statistics of cases extending over a period of years, and in order that a definite decision be arrived at by our Section, this should be done.

Dr. HILL (in reply).

Sir StClair Thomson, whilst recognizing the connexion between nasal catarrh and aural catarrh also emphasizes the more widespread factor of a tendency to general catarrh in certain individuals, and it may very well be that this conjunction of the local nasal factor, combined with the constitutional factor, may form the necessary determining causes in these cases. His instance of the absence of deafness in cases of complete bony occlusion of the choanæ is inadmissible, as Dr. Spicer and Dr. Grant have clearly shown that "negative pressure" is abolished by mouth-breathing.

Dr. Gray has questioned the use of the expression "negative pressure." It is not mine. It is in common use and well understood by physiologists, physicists, engineers and aëronautists. I will draw a base line across the middle of this blackboard to represent the normal atmospheric pressure at the earth's surface at any particular point. To represent the pressure as we descend a mine at various depths we show increased pressure below the base line by the mathematical sign +, and this is colloquially alluded to as plus or positive pressure. In the same way the pressure decreases as we ascend a mountain or into the higher regions of the air, and this rarefaction or diminished pressure is indicated above the base line by the sign — and is colloquially spoken of as negative pressure.

Dr. Gray's pronouncement that surgery of any kind, including nasal surgery, is apt to have a prejudicial effect in otosclerosis is of value coming from such an authority on the subject.

Dr. Watson-Williams has responded to my invitation to elucidate the sinusitis question and has brought forward most unexpected evidence that the ears may be reflexly and acutely affected by infective sinusitis even of the non-suppurative kind, more especially sphenoidal sinusitis. Should these new and heterodox views turn out to be correct a new terror will be added to all concerned and the door will possibly be opened for a good deal of quackery. It is to be hoped, therefore, these views on the direct and the reflex effect of these non-suppurative septic processes, which Mr. Stuart-Low also supports, may eventually turn out to apply only to an infinitesimal proportion of cases.

I quite agree with Dr. Goldsmith that in cases of nasal catarrhal obstruction the mere statement of the patients that they are not in the least deaf should not be accepted. Careful testing is necessary to decide the point of incipient deafness as in polypus cases, and renewed testing is necessary from time to time to ascertain whether the deafness, though slight, is progressive.

Mr. Tilley's summary of the principles which should guide us in deciding when to operate and what is the prospect of relieving the deafness or preventing its further progress is excellent and incontrovertible, but requires to be supplemented by the further test emphasized by Dr. Kelson—viz.: to observe whether any good effect is produced by a course of nasal and post-nasal spraying and douching, as this sometimes relieves the deafness in a remarkable manner when the inflation and bougie tests are not encouraging.

Dr. Grant has told us that in partial nasal obstruction forced respiration tends to increased congestion and tumefaction. In my own person I have observed that deep forcible nasal respiration tends to relieve the nasal obstruction and also the tubal congestion from which I suffer on retiring to bed when I am the victim of bad nasal catarrh or of influenza. It seems to me that the moderate claims made by Dr. Grant in favour of negative pressure, though unsupported by others present, are not in themselves so far-fetched as to be pronounced untenable.

In the class of cases under discussion, whilst we must be on our guard not to raise false hopes and promise too much from nasal operative measures and indulge in what may be rightly described as surgical interference, it is, on the other hand, equally important that we should not fall into the opposite error of doing too little, and therefore failing in our duty to do the best for our patient.

Section of Otology.

President—H. J. BANKS DAVIS, M.B.

Aural Bacteræmia, with Illustrative Cases.[1]

By RICHARD LAKE, F.R.C.S.

(ABSTRACT.)

IN this paper pyæmia is distinguished from aural bacteræmia as being a fairly well defined disease, and in the author's opinion the two are better kept separate; bacteræmia being a condition in which living bacilli are found free in the blood-stream.

There are two classes of bacteræmia: one in which the inhibitory power of the blood very rapidly destroys the bacteria, and the second in which the inhibitory action of the blood is for some reason kept in abeyance.

The presence of bacteria in the blood is indicated mainly by the height of the temperature.

More usually the infecting organism is one of the varieties of streptococcus, more rarely of staphylococcus.

Its connexion with regard to mastoid disease is discussed.

Symptoms.—Mastoid tenderness, high temperature, absence of intracranial lesions, absence of rigors and of delirium, normal cerebro-spinal fluid, occasional absence of aural discharge.

ILLUSTRATIVE CASES.

Case I.—P. S., aged 9, with the following history: He was first seen on May 31, 1917. He had had earache in the left ear the previous summer after an operation for adenoids. Also an indefinite history of earache just before this. The present attack commenced at the end of January. The earache improved, and did not recur until May 25. When I first saw him his temperature was 100·8° F., and there was tenderness over the whole of the mastoid. The tympanic membrane was covered by desquamated epithelium, but there was no bulging of the drum, nor any redness. The evening before operation the temperature was 103° F. Cultures from the blood showed a free growth of staphylococci. The morning and evening temperature for the first four days after the operation varied from 99·6° F. in the morning to 101·8° F. in the evening. From the fifth day onwards he had no rise of temperature and did perfectly well.

---

[1] At a meeting of the Section, held April 19, 1918.

Case II: Example of a more virulent case.—H. V. M., aged 17, bugler, R.N., was discharged from the Service at the end of 1916, after suffering for six months from otitis media. He visited the War Pensions Committee two days before admission, and was referred to the Seamen's Hospital for treatment. When seen the patient looked extremely ill. The right ear was discharging thick pus, and there was tenderness over the mastoid. The temperature was 97° F., and the pulse 84. He was ordered urotropin, 10 gr., three times a day. His ear was washed out with a chlorine lotion, and he was given large quantities of fluid. On October 27, 1917, the blood cultures showed a lively growth of streptococci. The radical mastoid operation was done on November 1. Two pints of saline solution *per diem* were injected, and on the following day he was given two million units of antistreptococcic vaccine. On November 3 the temperature was normal. There was nothing to report except that the pulse and temperature ran gradually up. The temperature went up to 101·3° F., and fluctuated, and the pulse 96. The pulse and temperature fluctuated, but the temperature was not again above 101° F., nor the pulse above 96. On November 13 septic granulations began to appear in the ear. On November 12 there was some facial paralysis, and on the following day the deep reflexes became sluggish. The next day the oculist described the right eye as having the disk margins completely obscured, and the left eye as nearly so, and he therefore considered that some cerebral complication was present. The wound was re-opened, granular tissue scraped away, and the dura mater of both fossæ exposed, but the condition looked so normal that nothing further was done. The man gradually recovered, and has now left the hospital quite well. (Notes by Dr. Waine.)

Case III.—P. W., aged 14. He was taken ill at the Royal Naval School, Greenwich, with profuse discharge from the right ear, and a temperature of 102·6° F. This high temperature persisted without intermission. There were no cerebral symptoms. There was slight pain at the back of the neck, but no muscular stiffness. Lumbar puncture showed that the cerebro-spinal fluid was clear, and there was no growth of bacteria in cultures. Blood cultures showed a growth of streptococcus. He was given 10 c.c. of antistreptococcic serum. He was admitted into the Seamen's Hospital on December 21. He had suffered from middle-ear disease for the last eight years. On admission his temperature was 103° F., and his pulse 112, weak and irregular. There was a purulent discharge from the right ear, tenderness in the mastoid region, and clear mentality. He complained of pain in the neck on moving the head. A complete—not radical—mastoid operation was done. In this case the temperature became subnormal on the first day, rising to 101° F. on the second. The pulse-rate remained high. Antistreptococcic serum was given subcutaneously, and saline solution administered. The boy was slightly delirious. The saline was repeated. On December 25 there was an abscess under the right clavicle, and a pint of saline was given. By December 25 the mastoid wound was cleaned. Early in January he had an abscess in the left buttock, a most unusual symptom. No others were present. (Notes by Dr. E. J. Quick.)

DISCUSSION.

Mr. MARK HOVELL: Major Richard J. Cowen had a patient with septicæmia following parturition, temperature 104° F. He injected, subcutaneously, 5 c.c. of collosol argentum, and the temperature in a very few hours fell to 99° F. Within the twenty-four hours he injected another 5 c.c. of the same drug; the temperature then fell to normal and remained so. A drug which will do this is worth knowing, and will be of use especially to general practitioners.

Dr. JOBSON HORNE: It is necessary to bear in mind that even in the presence of suppurative disease of the ear the resulting growth, whether it be in the words of the author "a free growth of staphylococci" or "a lively growth of streptococci," may be due to one of many causes other than aural disease. The contingency of these other diseases must be eliminated before attacking the mastoid.

Dr. DAN MCKENZIE: The whole interest of the subject lies in the question of the diagnosis between bacteræmia and sinus thrombosis. I should say that some of the cases on which we operate for lateral sinus thrombosis without finding a thrombus in the sinus and in which the patient gets well, have been cases of bacteræmia. It will always be difficult to decide when there is or is not a clot in the sinus because of the presence or absence of bacteræmia. Can we diagnose a simple bacteræmia from one in which there is sinus thrombosis?

When a rigor is present, one expects to find a thrombus in the sinus. But there are many cases of sinus thrombosis without rigors, especially in children. When there is any doubt, I should be inclined always to open the sinus to make sure, because I think it is the general experience that when a sinus has been opened the subsequent course is not jeopardized. My experience suggests that it may be less dangerous to expose a lateral sinus and to explore it than to expose it accidentally and to leave it unopened. The danger of the accidental operative exposure of the sinus was first raised by Mr. Hunter Tod at the meeting of the American Surgeons in London in 1914, and my subsequent experience confirms his view.

Dr. WATSON-WILLIAMS: I agree with Dr. Dan McKenzie to this extent—viz., that if I thought there might be a commencing clot, I should open the lateral sinus, and should feel this course safer. I am not clear as to what was the operation referred to in Case I. The result is interesting as supporting the value of anti-streptococcic serum. Failures are sometimes due to our giving inadequate dosage. In a case of streptococcic infection I give at least 30 c.c. to 40 c.c. in the first twenty-four hours, and perhaps I give 20 c.c. the next day. I then stop, unless there are strong indications to go on. I have not injected it into the spinal fluid.

Mr. H. L. WHALE: I am surprised and interested to hear the view expressed as to opening the sinus. I have always thought and taught that of all the structures one encounters in operating on the lateral sinus, the dura is the most resistant, to clear away the bone being the paramount object; and when you get to the sinus you are safe, provided it is not opened.

Mr. MOLLISON: I have been unfortunate in blood cultures, for only rarely have I been able to grow anything from blood specimens. It takes about three days to get cultures, and in that time one may lose the patient, unless active treatment has been instituted. It is difficult to decide between bacteræmia and pyæmia. I have seen cases in which the ear has eventually shown itself to be the cause of the disease, but the first manifestation was secondary abscesses: the lateral sinus in one case subsequently became completely obliterated as a result of the disease.

Mr. W. STUART-LOW: Discussion of this subject is important, as there is confusion in the minds of some practitioners. Introducing a new name does not help. The practitioner knows of septicæmia and pyæmia and sapræmia. He seldom calls us in for septicæmia, waiting for something else to develop. If this paper should lead practitioners to call us in sooner I should welcome it, but I think it will only complicate matters. Certainly we are often consulted too late. There is always an idea of hanging on without operation, and that is encouraged by remedies being suggested, such as vaccines and urotropine. It is soothing to be told the temperature will go down, but meantime the patient is dangerously drifting. Urotropine has been much animadverted upon. It is wise to be sure there is no kidney or other disease before giving it. I have seen a number of cases in which vaccines have been used and pneumonia has subsequently developed, the patient remaining in a dangerous condition for some days. I have a shrewd idea that many of the cases which give trouble are those in which the throat has not been operated upon, and the focus there has acted deleteriously, prolonging convalescence.

Mr. O'MALLEY: It is difficult to differentiate between bacteræmia, in which the blood gets infected by a focal nidus in the ear, and a pure sinus thrombosis the result of acute mastoid suppuration. Early last year I had a patient, a man aged 36, and the medical officer told me he complained of deafness and pain in one ear for three days: he was when seen complaining of tenderness over the mastoid. I found his membrane was definitely injected, but there was neither œdema nor pus. He was deaf on one side, and over his mastoid he was tender along the posterior border and also over the tip. The temperature was 104° F.; I could not ascertain any history of rigors. Sinus thrombosis seemed to be the only reasonable diagnosis: if there had been a rigor it would have pointed definitely to the need for operation. The medical officer demurred, saying that as the man had been abroad, malaria should be thought of. A blood examination was made, but it was two or three days before a report was received. On the third day the temperature was 104° F., but there was still no pus in the ear, and apparently no further progress had been made in the local infection. By the fourth day we got a report that there were some pneumococci in the blood, and a smear from the throat revealed the same organism. The general conditions were improving, there was nothing wrong with the chest, and I concluded he got a pneumococcal infection through his ear into the blood. On the fifth day the temperature fell to normal and remained so; there was no subsequent suppuration. He had had no treatment except quinine on the malaria hypothesis. I congratulate myself on not having opened his mastoid. If in this case I had done so I should have attributed the improvement to that measure.

Mr. C. E. WEST: The question of general infections is very difficult and wide. The infection varies, from a mere temporary blood invasion which may disappear before any culture can be made, to a pyæmic condition with multiple abscesses in the viscera. It is a mistake to attempt to differentiate these conditions by terminology, as this may suggest definite clinical entities which do not exist. To speak of them as blood infections or septicæmias or bacteræmias and mix all the cases together is the safest way. There is a type apparently the result of bacteræmia which I have seen once or twice, which was beautifully developed in a recent case, a type not mentioned by Mr. Lake. I mean a non-suppurative local but distant infection, very much of the class of subacute rheumatism. I have seen it follow tonsillitis and acute invasions of the mastoid, and have seen it in connexion with suppurating war wounds. These cases have a fluctuating temperature and sweats, and there may be pericarditis, tender, sometimes swollen, spots, often about joints or in connexion with ligaments and tendons and periosteum. If the tender spots are on the scalp the patient cannot bear brushing of the hair. The most striking point in one such case was an inflammatory focus in the neighbourhood of the sciatic notch, with intense pain and tenderness along the course of the sciatic nerve. What used to be described as minor pyæmias are of great interest. It is a condition for which we should keep our eyes open, but about which we should not be unduly alarmed, for if they are hung on to they will get well. My specific is large doses of sodium salicylate or aspirin. The majority of patients will not welcome constant injections of saline, and if they can be got to take plenty of fluid by the mouth, I think the result will be as good.

The PRESIDENT: With regard to some of the potent drugs recommended to be used to reduce organisms in the blood, it seems that they may do as much harm as the bacteria themselves. I have found that inoculating anti-streptococcic serum into the spinal theca has the best effect. Smaller doses can then be used, and its action is quicker than when introduced into the veins. Liquor ammoniæ prevents clotting in lateral sinus infections. I order five drops in water three times a day. I have mentioned it to several surgeons, who have used this for thromboses in varicose veins in legs and elsewhere. The effect of this solution, which is rapid in its results, impedes thrombosis, and to those who have not tried it, I can strongly recommend it in these cases; added to which it is a strong circulatory stimulant, and benefits the patient in other ways.

Dr. WYLIE: In several cases similar to Mr. Lake's I have successfully injected into the vein 5 c.c. of 1 in 1,000 dilution of perchloride of mercury. When suffering from streptococcal poisoning, swelling of the axillary glands and high temperature, I rapidly recovered after an injection of the solution.

Mr. MUSGRAVE WOODMAN (Birmingham): With regard to Dr. McKenzie's remark about exposing the lateral sinus, does he mean exposing the bony sinus or the dura mater? I have operated on many of these cases, and when in doubt I always slice off the bone until I expose the sinus, making a ½ in. opening. I never open the sinus itself unless it is obviously thrombosed, and I have not known bad effects to occur.

Dr. DAN MCKENZIE: The operative exposure of the lateral sinus, like that described by Mr. Woodman is harmless in most cases, but there are a certain proportion in which sinus thrombosis follows in eight to ten days. When a sinus has been exposed I am anxious about the case until the tenth day. And when, under such circumstances, I have had to open the sinus, I have been certain that exposure at the time of operation had infected the sinus. Consequently, I have almost decided it is safer to open and expose the sinus. Risk of thrombosis occurring after operation is less when the sinus, if exposed by disease, is covered with granulations.

Dr. KELSON: The fallacy of confusing *post* with *propter hoc* is most common in these cases. Remedies such as those mentioned should not be accepted upon the experience of a few cases. Many cases recover by themselves.

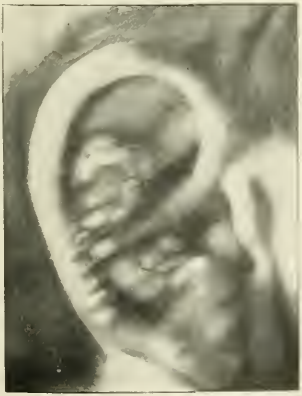
Mr. Somerville Hastings: In cases of doubt it is wise to open the lateral sinus groove. I have never regretted doing it, but deplored omitting to do it. It is a very important matter, especially in children, because it is often difficult to know whether there are granulations on the lateral sinus. I always open the lateral sinus groove, and freely expose the sinus in doubtful cases. I am surprised to hear of Dr. Dan McKenzie's experience.

Mr. Lake (in reply): I felt interested in the remark about collosol argentum: I have desired to try it but have never done so. The question of the exposure of the sinus must be left to the individual surgeon. My position is that I would not open a sinus unless I saw a good reason for doing so. The diagnosis of pyæmia and bacteræmia is difficult: I can draw no hard-and-fast line. Sinus pyæmia has been so often discussed that I did not wish to introduce it on this occasion. I do not regard urotropine as a specific, and it must be used with due precautions.

Recurrent Herpes of Auricle in a Boy, aged 9.

By H. J. Banks Davis, M.B. (President).

Ever since the age of 4 he has had attacks of herpes regularly once a year: "he feels ill and is feverish," and has an aural eczematous discharge. The attack lasts two weeks and is always unilateral,



Recurrent herpes of auricle in boy, age 9.

affecting the right ear alone. He was sent to my department by Dr. Pernet. There was no glandular enlargement.

The photograph of auricle, by Dr. Morton, shows the vesicular eruption when at its height.

DISCUSSION.

Mr. H. L. WHALE: Was there dental caries, or any other cause of irritation of the fifth nerve?

Dr. DAN MCKENZIE: Dermatitis herpetiformis must be remembered: it is like herpes, but recurs in the same place. I have seen it return three or four times.

The PRESIDENT (in reply): We could find no cause of irritation. Dr. Pernet sent the case to me. The patient had a discharge from the ear, which was eczematous. Dr. Pernet made the diagnosis given in the title: he had had him under care some time. Vesicles were present on the back of the auricle as well as on the front.

Acute Mastoiditis in a Boy, aged 8; Spontaneous Recovery.

By H. J. BANKS DAVIS, M.B.

THREE months ago this boy was admitted into hospital with an acute right-sided mastoid. There was bulging forward of the ear and post-aural tenderness, which was extreme, but no aural discharge, and I therefore looked upon the case as urgent, and he was prepared for immediate operation. Fortunately for him, this, for certain reasons, had to be postponed, and when I saw him next day all symptoms had vanished so rapidly that I decided to leave him alone, and he has had no further symptoms. His hearing is unaffected and the membrane normal. Free drainage through the Eustachian tube must have existed for resolution to occur so rapidly.

DISCUSSION.

The PRESIDENT: It was three days before we got permission to operate, although the local signs were urgent, and by that time these had subsided. His hearing is now normal, and there has been no further trouble.

Mr. O'MALLEY: Recently I have had two cases in which I felt convinced I should have to open the mastoid. Both had a bulging membrane, but in neither had the membrane perforated or shown evidence of pus. There was intense pain over the mastoid generally. I dealt with the cases by myringotomy, and they cleared up.

Mr. W. STUART-LOW: It is possible that this was an ill-defined diffuse furuncle of the meatus, extending to the tympanic membrane and to the periosteum of the mastoid with intense œdema. It is a fact that many such cases are operated upon in mistake for an acute mastoid condition, and this always cures them.

The PRESIDENT (in reply): I think a furuncle could not have got well so quickly. The only local treatment was to shave the head, and prepare the skin with iodine for operation. A girl who was admitted into hospital as a case of "acute mastoid," had intense pain and I was summoned to operate. I saw at once it was not an acute mastoid as there was a furuncle in the meatus, and adenitis behind the ear. I told the resident medical officer to incise the meatus, and she was sent out. She, however, went off to another hospital and I learned she had been operated upon for "acute mastoid" by the assistants, much to the annoyance of the aural surgeon there, who as soon as he saw it recognized the real condition.

Parotid Fistula of Twelve Months' Duration in a Man, aged 50.

By H. J. BANKS DAVIS, M.B.

TWELVE months ago the patient had acute earache, with aural discharge on right side. He developed a small subcutaneous abscess in the neck below the mastoid, which was incised under gas in the Casualty Department. Ever since then he has had a watery discharge from a pin-point hole in the scar. When at meals "the water streams down his neck and he continually has to wipe it away." This shows the importance of not incising deeper than the skin in abscesses superficial to the parotid on the face, and also the importance of remembering that the superficial posterior lobe of the parotid extends back to the mastoid process. The sinus, which appears further back than one would expect, should close up under ionic electrical treatment.

DISCUSSION.

Dr. KELSON: What is the evidence in support of it being parotid fluid? The discharge is said to come from the ear, and I do not see why it should not be cerebro-spinal fluid. It is said that there was an abscess first. The case is obviously a very rare one.

Dr. ALBERT GRAY: It is surprising if cerebro-spinal fluid appeared after all those months: I should expect the sinus to have cicatrized by then.

The PRESIDENT (in reply): If he is given anything to smell, or even to look at, the fluid streams out of the neck. I am obliged for the suggestion, it may be cerebro-spinal fluid. The Pathological Department reported it was salivary fluid, but I will have further tests made.[1]

Depressed Scar following Mastoid Operation.

By H. J. BANKS DAVIS, M.B.

A GIRL aged 13. Operation for acute mastoid disease was performed seven years ago. The post-aural wound which had to be left open owing to the extent of the disease has never closed over; the ear is dry and the bone cavity epithelialized. Two years ago I performed a plastic operation, but the skin and scar tissue gave way, and the result was unsatisfactory. I should be glad of any suggestions. The patient's chief troubles are that the curved end of her spectacle wire is liable to be "caught up" in the cavity behind the pinna, and that she becomes giddy in cold weather.

DISCUSSION.

Mr. O'MALLEY: If you had embedded a piece of cartilage in the neck and turned it up, like a plastic operation on the nose, you would have filled that hole in the mastoid.

Mr. SOMERVILLE HASTINGS: I should advise dissecting off the scar-epithelium covering the depression in the bone, cutting a piece of rib-cartilage to the right size and shape to fill the depression, and then bringing the skin edges together to cover this in. Rib-cartilage has such wonderful vitality that even if suppuration occurs the cartilage usually lives.

Mr. WHALE: I think this can be closed by a flap operation. There will be three stages: first, skin to fill in the cavity; second, another piece to cover it; and, thirdly, when that is healed up an osteoperiosteal graft from the tibia. In February I saw Sebileau, in Paris, fill up an extensive depression in the frontal sinus in this way. He did not do a preliminary operation, because the skin was there already, whereas in this case it is not. A bed must be made for it first. I think you should not touch the posterior surface of the pinna; take a bold flap from lower down in the neck; there will be very little hair there yet, as she is young.

---

[1] This has now been done and the report is that the fluid comes from the salivary glands. Dr. Macdougal tells me that when the neck sinus healed by ionization, pressure on the parotid caused fluid to exude from the ear. This is what members may have seen, and this the patient says occurs, but I have been unable to verify it, as on each occasion clear fluid exuded from the neck, although the mouth of the sinus is so minute as to be almost invisible.—H. J. B. D.

The PRESIDENT (in reply): It is on account of the deformity that I think another operation for closing up should be performed. In this case there was extensive bone disease, and such a deformity is particularly distressing for a girl. The antral and mastoid cavity has epithelialized, and the scar tissue behind the ear is very thin, and doubtless will break down again.

Latent Mastoid Abscess.

By RICHARD LAKE, F.R.C.S.

THIS case was seen with Dr. J. T. C. Laing on April 26, 1916. The patient was a young man, aged 19, well developed, with the following history, which appeared to be both interesting and somewhat unusual. Five years ago he had an acute attack of measles, during which he suffered from acute otalgia on the right side. This was followed by considerable swelling in the posterior superior triangle of the neck on the same side. This swelling was treated by poultices for some considerable time, and ultimately disappeared. At the same time a large amount of pus was discharged through the nose and mouth. After this spontaneous evacuation of the pus the medical man in attendance was able to squeeze more pus from the neck through into the nasopharynx.

To all intents and purposes the boy became perfectly well, but since his illness it had become a great effort to him to work. There seem to me to be some discrepancies in the statements as to his mental condition before and after the evacuation of the pus, but, judging from what appear to me to be more reliable data, it seems that previously he was by no means mentally brilliant. Too much stress should therefore not be laid upon the fact that it was an effort for him to work afterwards, although at the time he was under my observation, as will be seen, I did not take this view. The young man went to college, where he was completely unable to concentrate his attention on the subjects he was studying. When seen his appearance was that of chronic sepsis, his complexion being sallow and his expression rather dull. He gave me to understand that he was the subject of frequent earache and headache. He was at that time suffering from earache, about which he was sent to me for an opinion.

On examination there was distinct tenderness, though not pain, on pressure in the lower part of the mastoid process on the right side, being especially marked at the tip and in front. There was no tenderness over the mastoid antrum, and the drum, although it was rather dull in appearance, showed no sign of any inflammatory condition, nor was there any bulging of the drum or meatus. On the following day the tenderness had become slightly more pronounced, and there was some swelling over the lower end of the mastoid and the posterior and upper part of the neck, but it was by no means marked. There was also a question as to whether or not there was slight swelling of the posterior part of the tympanic membrane.

I opened the mastoid on April 28, and the condition found is well worthy of notice. To begin with the periosteum was firmly adherent, and considerable effort was required for its deflection. The bone itself was extremely dense, and—though white and dry—was very fibrous in consistency. Pus was found in the antrum and evacuated, but there was no obvious track leading further on. The outer wall of the tip of the mastoid was then cut away, and a cavity was exposed, yielding at least half a drachm of pus. This cavity was lined with a thick layer of old granulation tissue.

The usual treatment was adopted, and healing occurred without any interruption worth mentioning. Owing to the mental condition of the patient, I was unable definitely to exclude the possibility of an origin from temporo-sphenoidal abscess. This possibility, however, was negatived by Dr. Henry Head after careful examination. There appears to me to be absolutely no doubt that this young man had a perforation of the inner wall of the mastoid process into the digastric fossa, and that the pus followed the somewhat unusual—but by no means unheard of—course of the under surface of the Eustachian tube, and evacuated itself into the nasopharynx. He then appears to have had a latent empyema of the mastoid, which now and then became slightly active, but always quieted down under treatment. As I told his mother, I considered that this attack was rather a good thing for him than otherwise, in that it led to his mastoid being opened and the state of affairs definitely settled.

DISCUSSION.

Dr. P. WATSON-WILLIAMS: Were the organisms examined? It looks like staphylococcic infection. Sometimes they are inhibited by plenty of polynuclears, so there may be a collection of pus which is very indolent and yet keeps up some septic infection. It is a common mistake to regard the staphylococcus as a harmless organism. It is as harmful as streptococcus, but takes longer in developing complications.

Dr. DAN MCKENZIE: This is one of an interesting series of cases in which pus tracks down from the mastoid region, or the deep mastoid region, towards the nasopharynx, going in an inward and forward direction. They may be commoner than we suppose. Three years ago I collected notes of sixty of them from the literature.[1] Some have been post-mortem cases, the condition not having been recognized during life, probably because an examination of the throat in cases of mastoid abscess is not always made. Some have been treated successfully by the method Nature has adopted in this case—namely, the opening the abscess in the pharynx. If the cellulitis in the neck continues and does not heal up in spite of free incisions in the neck, when the pus discharges from the pharynx, or the abscess is opened there, the case quickly gets well. The reason seems to be that that is the lowest point in the extensive abscess formation. I have shown one case in which pus got as far as the pharynx, but I opened it from the ear, through the anterior meatal wall, getting into the pterygoid maxillary fossa, deep to the inferior maxilla. Mr. Cheatle has reported two or three of these cases.

Mr. LAKE (in reply): The pus was not examined in this case.

Extradural Abscess perforating Skull.

By RICHARD LAKE, F.R.C.S.

THIS case was that of a man, aged 58, who was sent to me by Dr. Cobbledick with an eight weeks' history. The commencement of his illness was an attack of influenza, after which he became very deaf on the left side. About a fortnight after the onset of the influenza there was some meatal swelling and pain on the left side. He remained deaf and unwell until about two days before I saw him, when a large swelling suddenly developed just behind the back of his ear, midway between the external meatus and the external occipital protuberance, and almost in that line. There was no sign of any trouble in the middle ear, nor had there been after the temporary tenderness of six weeks before.

He was taken into a nursing home, and operated upon the following morning. A curved incision was made with the convexity upwards, commencing with the tip of the mastoid, and terminating at the posterior aspect of the swelling previously referred to. Through the posterior portion of the incision a large abscess cavity was opened. This, when cleaned, showed a perforation into the left parietal bone. This was opened, and followed forwards, into an intracranial and extradural abscess cavity, which extended to the posterior portion of the mastoid process, passing round in front of the lateral sinus. The whole of the mastoid process itself was involved. All the diseased tissue was very completely removed, a very free opening into the middle ear made under antiseptic precautions, and the wound closed. Healing was quite uneventful, and hearing completely restored, as it also was in the case previously reported.

---

[1] *Journ. Laryngol.*, 1915, xxx, p. 12.

I think it is only just to say in regard to the original operation for the relief of acute mastoiditis, that if the operation is not unduly delayed, and if it is efficiently performed, the probabilities are that there is no loss of hearing.

The PRESIDENT: Perforation of the parietal bone is an unusual event. I agree with the statement, "if the operation is not unduly delayed, and is efficiently performed, the probabilities are that there is no loss of hearing."

Loss of Hearing due to Delay in Operating.

By RICHARD LAKE, F.R.C.S.

THIS is a case which I am adding in order to show the disastrous effects of delay in acute and subacute suppurative otitis media.

A little boy, aged 5, was brought to me on April 16, 1916, when I advised immediate operation. Although tenderness over the mastoid antrum was slight, there was deep swelling of the upper and posterior part of the meatus. Suppuration had lasted for a sufficiently long time, that is to say six weeks, to lead me to express the opinion that unless operation was done within a reasonable time the boy's hearing would be lost, to say nothing of the fact that as long as suppuration persisted he was exposed to unnecessary danger. I cannot but think that it was very unfortunate that he was taken to get another opinion, or perhaps I should say that it was particularly unfortunate that he was taken to the particular person who gave the opinion; for the mother was assured that there was no reason for operation. Six months later the boy was brought to me again, the suppuration still persisting, although the tenderness had quite disappeared, and so had the hearing. I operated, with a satisfactory result so far as the suppuration was concerned, but the boy remains completely deaf on the affected side.

Case of Cerebral Abscess; Hernia cerebri; Avulsion of Abscess Wall; Complete Homolateral Ophthalmoplegia; Recovery.

By W. M. Mollison, M.C.

The patient, a boy aged 12½, was admitted to Guy's Hospital on September 22, 1917, suffering from frontal headache and vomiting, with pain and tenderness over the right mastoid process. There was no history of otorrhœa, but the patient had had scarlet fever at the age of 2. Four weeks before admission the boy struck his head in a swimming bath; though dazed he was able to walk home and had no further symptoms for fourteen days. He was confined to his bed with an illness which his doctor diagnosed as mumps: he had pain in the right ear, was sleepless and restless, had much headache which made him cry, was somewhat intolerant of light, had no appetite and lost weight rapidly. For the week previous to admission vomiting, at first once a day, became frequent. Stated to have had otorrhœa for two days only.

On admission the temperature was 97° F. and pulse 68; the boy was drowsy and lay curled up on his right side: he had photophobia and complained of frontal headache. There was foul pus in the right meatus and a perforation in the posterior part of the membrane; the right pupil was larger than the left and optic neuritis was present. Lumbar puncture showed the cerebro-spinal fluid clear but under increased pressure. Tenderness over the mastoid process was not marked. Cerebral abscess was diagnosed. Operation was performed and about an ounce of foul pus evacuated from a temporo-sphenoidal abscess, and a double rubber drainage tube was inserted. The boy made good progress till October 19, when he again exhibited symptoms of pus retention, and a further collection of pus was opened. He improved, but again on November 3 a further collection was evacuated. The patient was now very ill and a hernia cerebri developed; lumbar puncture showed cloudy fluid but no organisms on cultivation; the temperature rose and on one occasion reached 105° F. On November 10 while dressing the wound, a large part of the hernia was pulled off and was found to consist largely of the cerebral abscess sac: this was removed entirely. Hypertonic saline was now used as a dressing.

Three days later complete ophthalmoplegia was noted to be present on the right side and paralysis of the opposite external rectus.

Mr. Ormond kindly saw the case and reported:—

"Right eye looks straight forward; very slight movement up and down, even less from side to side; no paralysis of levator palpebræ. Pupil is large but reacts sluggishly; optic neuritis in both eyes. Left eye: No movement outwards, pupil active. I think this condition due to interference with the centres for movement in the Rolandic area. ? Œdema. No local lesion will account for an involvement of third, fourth and sixth nerves, omitting the levator palpebræ and internal branch of the third."

The boy now made a slow recovery, and was discharged on December 29. The movements of the eyes gradually returned to normal.

Case of Subacute Mastoiditis; Paralysis of corresponding Sixth Nerve, recovering; Latent Maxillary Antral Infection, illustrating the advantageous Exploration of Sinuses by the Suction Syringe.

By P. Watson-Williams, M.D.

Examples of sixth nerve paralysis (paralysis of external rectus) occurring in association with mastoiditis are sufficiently rare to be worthy of record, and as the fatal cases have been attributed to meningeal infection at Dorello's space, the cases which spontaneously recover lead one to consider how far meningeal infection is an essential pathogenetic factor.

Another point of interest is that this patient, whose case was incidentally referred to by the reporter at the last meeting of the Otological Section, exemplifies the advantage of routine exploration by the suction syringe of the antral and sphenoidal sinuses in all cases of mastoiditis, even where the previous examination of the nose by the usual methods of inspection has led one to exclude sinus infection.

Sister K. was referred to the reporter by Dr. Hogan on December 3, 1917, complaining of purulent discharge from the right ear for one month with pain over the mastoid area increasing for a week. The mastoid region was red, swollen and tender, deafness almost complete, pus escaping from large tympanic perforation. Patient thin, sallow and weakly, had caught cold in air-raid while working in Poplar. Nose: no discharge seen by anterior rhinoscopy nor by careful endo-rhinoscopy; condition believed normal.

December 14: Having been under observation in the Nursing Home for ten days with local treatment for the ear, no nasal symptoms nor discharge, a radical mastoid was performed, as the unnaturally small size of the meatus and extensive cellular formation led to the conclusion that a modified mastoid operation would fail. Exploration of the maxillary antra by washing with the suction syringe: Right antrum quite clear, left antrum full of yellowish curdy pus. Sphenoidal sinuses explored, both sides clear. After the usual mastoid operation, the left antrum was opened pernasally through the inferior meatus sufficiently for drainage.

Subsequent film examination and culture report by Professor Walker Hall: "Right antrum: Film—polynuclears and excess of mucus. Culture—no cocci, proteus only. Left antrum: Film—polynuclears, phagocytosis of G. P. Culture—cocci, G. P. staphylococcus; *Bacillus proteus.* (Pneumococci and bacilli did not grow out in special media.)" This report justified the antral operation despite the absence of so-called characteristic symptoms pointing to antral infection and seems to explain the source of the aural infection.

December 20: Patient steadily progressing but purulent discharge from the mastoid wound extraordinarily profuse. Eyes examined by Captain Stack. No optic neuritis, no paresis. Facial paresis slight, had developed about three days after operation and still present.

December 29: Still much purulent discharge. Facial paresis has disappeared, but the right external rectus has become paralysed; double vision. There are no general nor cerebral symptoms characteristic of meningeal infection.

January 3: Still much pus from mastoid area.

January 26: Patient sent home with mastoid wound healed, but right sixth nerve still completely paralysed.

March 4: Doing very well. Captain Stack reports that the right sixth nerve is recovering, and that "the movement is now almost normal, diplopia is less, and therefore more bothering."

Note.—Except for a slight rise of temperature the day after the operation the temperature remained practically normal throughout.

The extraordinary purulent discharge from the mastoid wound with transient facial paralysis developing some days after operation and succeeded by sixth nerve paralysis suggested that the cellular condition of the mastoid and petrous portion was unusually developed. Anxiety was felt as to the possibility of meningitis developing but was negatived by the absence of any characteristic symptoms. The fact that the nasal sinuses had been explored and the infected antrum opened and drained reassured the operator when the unusual purulent discharge from the mastoid area suggested sources of re-infection. Had such exploration been omitted at the time of operation it would have been carried out subsequently. Latent infective nasal sinusitis may cause no local nor characteristic symptoms and give rise to no obvious nasal discharge, while also proving a source of danger.

This is the case referred to by the speaker at the last meeting of the Section to illustrate the desirability of a routine exploration of the sinuses in suppurative otitis, the method being simple and accurate and occupying only two minutes under an anæsthetic or, if done previously, under cocaine anæsthesia. Definite gross evidence of the purulent nature of the extracted discharge is usually essential before an immediate operation on the sinuses found involved is justifiable. But more conclusive evidence of any given sinus being infected may be furnished by the subsequent pathological report, although no gross evidence of pus is found in the sinus washing. In other words, it is contended that a nasal sinus may be infected by pyogenic organisms, but that the polynuclears may be relatively so scarce that the discharge does not appear to the naked eye to be definitely purulent. Moreover it is contended that given a sinus infection, the relative paucity of polynuclears tends to result in systemic toxic infection, whereas the cases in which the polynuclears are prolific often suffer less from systemic poisoning, inasmuch as the more active phagocytosis protects the patient when the discharge is the more definitely purulent. The failure to observe pus in the nasal passages does not exclude an active nasal sinus infection and in suspicious cases the general symptoms or other evidences, e.g., local complications, may call for further investigation of the sinuses than the ordinary routine methods of inspection, particularly when the latter are negative.

Whether an operation should be performed on an infected sinus is another matter and often enough lavage of the sinus and injection of a suitable disinfectant will ensure its restoration to a normal condition and prevent that source of infection remaining operative for further and more widespread infection.

DISCUSSION.

Dr. WATSON-WILLIAMS: I suggest the advisability of exploring the antra in all cases in adults, even sphenoidal sinuses also, when the patients are on the table under an anæsthetic, as it only takes a couple of minutes. Knowing whether the antra are clear or not assists in the operation. Latent sinus infection is more frequent than we have any idea of. I have had more than a couple of thousand cases in which I have used the exploring syringe, and I have been driven to the conclusion that pus may sometimes be found in cases in which there was no previous indication of its presence. Recently a child came to me with symptoms of adenoids; there were no adenoids, nor enlarged tonsils: she seemed stupid, and had had recurring colds and nasal catarrh. Exploring her antra under an anæsthetic I found them clear, then exploration of the right sphenoidal sinus proved it clear. But on putting the cannula into the left sinus, I drew out over a drachm of thick pus, and, by the way the syringe worked, I knew there was polypoid degeneration of the lining mucosa. I opened and drained this sinus. Further, I feel convinced that cases of adenoids and tonsils are sometimes caused by a latent sinus infection. Constant re-infection of the tonsillar tissue causes it to become hypertrophied.

Dr. PEGLER: Does Dr. Watson-Williams mean by that suppuration can start the growth of pure lymphoid tissue? If so, it is an aspect of pathology which I do not understand.

Dr. WATSON-WILLIAMS (in reply): I believe the essential cause of hypertrophy of the nasopharyngeal tonsil and of the faucial tonsils is a lymphoid cell proliferation due to infection. And you will find that where there is a free response in lymphoid cell proliferation, there may be greatly enlarged tonsils with only very slight symptoms. And on the contrary you will often find clinical symptoms well marked where the enlargement is slight, because the infection is not inhibited by the effect of a free lymphoid cell proliferation. In acute tonsillitis the tonsils are often so enlarged that you think they must be operated upon soon; however they often subside after the acute infection has ceased.

Concentric Narrowing of each Meatus following Scarlet Fever at the age of 5.

By HERBERT TILLEY, F.R.C.S.

MRS. C., aged 47, applied to University College Hospital for "deafness" and "noises in the head." Examination: Each meatus was found to be obstructed by a diaphragm with a central perforation of a calibre which would admit the lead of an ordinary lead pencil. The edges of the perforations are clear-cut, white, and rather resistant. The stenoses thus caused are rather to the outer side of the junction of the cartilaginous and bony meatus. In each meatus there was some purulent discharge. After cleansing the passages and inflating with catheter, the hearing improved and the tinnitus ceased for two days. The patient says her symptoms date from the attack of scarlet fever.

DISCUSSION.

Dr. PEGLER: These constrictions remind me of the conditions seen after mastoid operation, in which there is an inveterate tendency to form a perforated web or ring of dense fibrous tissue round the region of the membrana tympani. I have had cases in which the ring has been removed and every method adopted; sometimes the whole ring has been cleared away, but without success.

Mr. O'MALLEY: I have had a case of which Mr. Tilley's reminds me, and I mention it because he may be thinking of doing an operation of a plastic kind on the ear. I did a plastic operation in my case, and I thought it would do excellently, but it has closed to a narrow limit, and I am very dissatisfied. For a similar case I should in the future skin-graft.

Dr. ALBERT GRAY: An interesting feature in this case is that it is bilateral. It is astonishing how very few become narrow after even prolonged suppuration. Since in this case both ears are narrowed, there must have been either some peculiarly irritating condition during the illness, or it is a case of congenital narrowing. But it looks more like scar tissue, which would be against congenital narrowing.

Dr. WATSON-WILLIAMS: I have seen an extraordinary instance of concentric narrowing of the meatus in a child. He was referred to me by Dr. A. Hutchison who had done a Schwartze operation on him. It was extraordinary how the child recovered with such a small meatus, 2½ mm. across. I think it was congenital, as Mr. Tilley's case may be.

Mr. TILLEY (in reply): At the circumference of the perforation one comes upon hard tissue. The idea of operating did not occur to me. I thought if I could relieve the discharge and get rid of the tinnitus, it was all I could do.

Case of Aural Fibroma.

By L. H. PEGLER, M.D.

THE patient, a widow, aged 73, of rather stout habit and in excellent health, consulted me at Fitzroy Square Ear and Throat Hospital in February, 1918, for a growth blocking up her right ear, with accompanying deafness. About two years ago she consulted a doctor, who told her she had a thickening of the drum, and the growth does not seem to have been visible externally more than two months. She has never had suppuration from the ear, and there were no inflammatory conditions. Neither macro- nor microscopically did the growth resemble the familiar aural polypus in any of its forms.

Inspection.—A tumour, of which the visible part was as large as the broad end of a pigeon's egg, projecting ¼ in. from the orifice of the external meatus. The surface was smooth, rather paler than the surrounding skin, and not sensitive to touch. With a probe the tapering body could be traced deeply to the fundus of the meatus, and a layer of cheesy material separated it from the meatal walls. I removed the growth under cocaine with the wire loop of a nasal snare. The hæmorrhage was free, and, owing to this, the attachment of the root could not at the time be ascertained satisfactorily. Subsequent changes in the part during healing have not assisted much in determining this point, especially as the growth came away entire, and there have been no remains of root or stump to cauterize or curette away. Until this afternoon I had not been able to see the patient for some weeks; at the last examination the greater part of the tensa and flaccida region were still undergoing change, and presented a smooth, red surface, not painful, and not yielding to gentle pressure with a probe. To-day I find this surface coated with a moist epithelial débris, and the patient speaks for the first time of a slight "watery" discharge—non-purulent and inodorous. There is some improvement in hearing. The left ear is quite normal.

Pathology.—The jar specimen exhibited in spirit was mounted at the Royal College of Surgeons for Professor Shattock, who has accepted it for the College Museum, with a microscopic section. It is a pear-shaped body with a tapering stalk, which measured in the recent state about 1½ in. in length and nearly 1 in. in circumference. A longitudinal segment has been removed for microscopic examination; the horizontal constriction near its middle was caused by the snare loop. The section consists from end to end of fibrous tissue, varying in density. In places it is made up of delicate interlacing fibrils, many of the cells of which are branched. Elsewhere the structure is denser, exhibiting bundles of wavy fibres which pass imperceptibly into the looser tissue. The arteries and veins seen in section do not call for special mention. The tumour is covered with normal stratified epithelium, which is furnished with a *stratum granulosum*.[1] The layers of squamous cells seen on the surface account for the smooth, skin-like contour presented by the protruding portion of the growth.

DISCUSSION.

Dr. A. GRAY: I think this fibroma sprang from the meatus, and not from the tympanic membrane, as the epidermis covering the tympanic membrane does not run in the wavy outline that ordinary skin does: this runs with the corium sticking up.

Mr. WHALE: I suggest Dr. Pegler should look to see where are the scars left by removal, now that he has removed the growth.

Mr. TILLEY: I think Dr. Pegler should adopt the suggestion made by Mr. Whale—viz., get rid of some of the desquamation by means of peroxide of hydrogen or carbouate of soda solution, and then apply a large-sized Peter's speculum (Siegle's) to the meatus. That method will give more information about a drum adhesion or perforation than any other means, and it does not seem to me that the value of the instrument is as appreciated as it should be.

Dr. PEGLER (replying to Mr. Tilley): I always employ Peter's modification of Siegle's speculum in my aural work. I shall certainly show the patient again.

[N.B.—At the time of going to press, the features of this case have cleared up considerably. The whitish débris has been got rid of by syringing, and the red, hardish, rather irregular surface has appeared again, but below this, about two-thirds of the inferior quadrant, consisting of a thin greyish papery membrane, has come into view, and moves slightly when examined with Peter's pneumatic speculum. The patient may be shown again at a later meeting.]

[1] This has an important bearing upon the question of its origin.

Section of Otology.

President—H. J. BANKS DAVIS, M.B.

A Series of Consecutive Cases in which the Mastoid has been operated on for Acute Suppurative Inflammation, B.I.P. (bismuth, iodoform, and liquid paraffin) inserted, and the External Wound sutured in its Entire Length at the Close of the Operation.[1]

By HERBERT TILLEY, F.R.C.S.

(ABSTRACT.)[2]

HITHERTO the exhibitor has been in the habit of leaving the greater part of the post-aural wound open and allowing the bony wound of the mastoid antrum and cells to granulate from the bottom. Drainage was provided for by loose wicks of gauze, a drainage tube, or by simply leaving the wound open without the insertion of any foreign body. As a general rule such cases took from three and a half to five weeks to heal completely. The wounds in the cases shown to-day have been sutured entirely at the close of the operation and the dressing removed on the fourth or fifth day. In most instances the patients have been able to go home within a fortnight.

BRIEF REPORT OF CASES.

(I) *Bezold's Mastoiditis.*

F. T., male, aged 17. Symptoms: Severe earache; œdema over mastoid and upper end of sternomastoid. Operation: Antrum and mastoid cells full of pus; lateral sinus exposed by disease. In hospital fifteen days.

---

[1] At a meeting of the Section, held May 31, 1918.

[2] The complete paper will appear in the *Journal of Laryngology, Rhinology, and Otology.*

F. R., male, aged 12. Symptoms: Earache; discharge; bulging of deep posterior meatal wall. Operation: Mastoid antrum filled with pus; cells inflamed. In hospital fifteen days.

L. H., female, aged 8. Symptoms: Severe earache: swelling (painful) in lower part of temporal fossa; drum pale and lustreless. Operation: Pus in antrum; cells near floor of antrum inflamed. In hospital twelve days.

S. J., female, aged 12. Symptoms: Projection of pinna; marked œdema over mastoid; meatus swollen and hiding tympanum; temperature 100·4° F. Operation: Half inch of œdema over mastoid; lateral sinus and dura above antrum were exposed by disease. In hospital twenty-five days.

(II) *Acute Exacerbation of Chronic Mastoid Suppuration.*

C. J., female, aged 7. Symptoms: Pain, "feverishness," one attack of vomiting; temperature, 104° F.; pulse, 110; respiration, 30; tenderness and redness below upper end of sternomastoid. Operation (January 29): Pus in antrum and mastoid cells; convalescence interrupted by broncho-pneumonia in right lung. In hospital twenty-two days.

W. B., male, aged 8. Symptoms: Earache; temperature, 103° F.; purulent discharge; œdema over mastoid: swelling of deep, posterior meatal wall. Operation: Pus in antrum and inflammation of adjoining mastoid cells. In hospital fifteen days.

DISCUSSION.

The PRESIDENT: My only criticism is, that the incision seems rather far back from the auricle, and that in only one of the cases were flaps cut. In acute mastoid cases I am always in the habit of cutting meatal flaps, which heal extraordinarily well. Does Mr. Tilley only smear the preparation in the bony cavity, or does he plug the wound with it? I have used too much B.I.P. in some of my cases, and my ward sister told me that cases in which a plug was used did not heal well. The less often you dress these cases the better. At one time the smell of iodoform was so associated with venereal disease that it constituted a great objection to its use. Poisoning following the use of this substance is mostly due not to the iodoform but to the bismuth ingredient which produces a blue line on the gums, nausea and abdominal pains. I have seen several cases which were identical with those of lead poisoning.

Dr. DAN MCKENZIE: Some of the surgeons at the Central London Throat Hospital have been using bismuth-iodoform paste for the last three or four years, and we have arrived at very much the same opinion about it as Mr. Tilley has. It makes a wonderful difference to a cortical mastoid case, rendering reactionary inflammation a thing of the past. One or two cases of iodoform poisoning have been reported, but I do not know of any at the Central London Hospital, though we have used it in a large number of operations. I show a syringe with which I inject the emulsion into the space: it is a very simple way of getting it into the bone cavity. I have used the paste for many other conditions, too, including radical mastoid cases. It does not seem to retard the growth of the graft, which is found to flourish in the midst of the paste. I have even filled up a brain abscess cavity with it, the only inconvenient sequel having been the discharge of the paste for some time afterwards. The case did well. It was a chronic brain abscess, with a lining to the cavity, and I thought there would be difficulty in getting it to close. I do not altogether support Mr. Tilley's plan of closing the whole of the wound at the time of the operation; I think it wiser to omit the stitches at the lower end and leave a drain in for a couple of days, because one is never sure of having got to the end of the disease. There may be retaining pockets, and closure of the whole wound in that case might upset the balance between the exudation from the raw surfaces and the organisms and their products in the open cavity, even in the presence of iodoform, which, in spite of what bacteriologists say, is a powerful antiseptic. Mr. Tilley in these cases has been successful, but if he keeps on long enough he is bound to come across cases in which it will be necessary to re-open afterwards. When the blood-clot method was first recommended I tried it, but had to give it up, and yet there were men who reported that they were continually employing it without a rise of temperature. I agree that the calming effect of this substance on inflamed conditions is extraordinary, but I prefer to leave in a drain for a couple of days, as in an aseptic neck wound. I have filled up a frontal sinus with the "Bipp," and it discharged for a long time. I do not know that the patient was either better or worse for it. I can warmly recommend the bismuth-iodoform paste.

Mr. W. STUART-LOW: I have given much attention to the cortical mastoid operation, having operated upon over 2,000 cases with very successful results as judged by the complete recovery of the hearing, non-recurrence of the suppuration, and absence of blemish from scar marking. I have found that the best position for the skin incision is in the retro-auricular line, practically the same as for the radical mastoid operation. This line of incision leaves very little mark after two or three weeks, and should any scar thickening remain it is very little visible. In Mr. Tilley's cases the line of incision is very long and very far back, and there is a considerable thickening, indeed, in half of the cases there is an evident keloid—in two this is exceptionally thick. This keloid condition is very probably a result of the bismuth in the B.I.P., as the powdered bismuth together with iodoform and oily particles between the edges of the healing wound must be somewhat of an irritant. I have heard of surgeons having X-ray pictures taken of limbs in which B.I.P. has been applied and the dark shadow clearly showing masses of unabsorbed bismuth lying in the tissue and between the ends of the bones in defectively united fractures. If this is so in the limbs, it must be so in the bony cells of the mastoid and ear cavities. I am sure it must be detrimental to the hearing to have the B.I.P. paste left on the meatus, attic, and tympanic cavity. I tested the hearing in these cases shown to-day, and found it defective in most of them to the extent of 25 per cent. I do not think it is justifiable to stitch up the wound in its entire length, but it should be left open at the lower part and a strip of gauze inserted there as a drain and to prevent too rapid healing. I disturb the soft structure as little as possible, open the mastoid antrum at its lowest point, curette it freely out, and then swab its walls with a solution of chloride of zinc—30 gr. to the ounce. Mr. Tilley says that on an average these children left the hospital in three weeks, whereas under my treatment the average time is eight days when the patient passes out of the hospital with the wound quite healed and the hearing completely restored. I am very particular to remove all dressings from the ear on the third day, substituting a dressing with an ointment composed of white wax 1, ointment of ammoniated mercury 3, which is applied warm to the wound and makes a perfect shield. If there is one place in the body where B.I.P. should never be used it is in the ear.

Mr. H. L. WHALE: I have used B.I.P. a good deal in France for all sorts of cranial wounds, and I have found it gives the best possible results. In frontal sinus cases, if the dura is exposed, we have used it with the greatest confidence, in fact for granulating wounds anywhere. It is not only used at the Front, but often at the Base too. We often have had cases heal in ten days without dressing, or practically so. Where there is a granulating cranial wound, and there is reason to fear brain abscess, we often stitch. With regard to Mr. Mark Hovell's remark, the iodoform does disappear in a most remarkable way, so much so that one sometimes gets a case from the Casualty Clearing Station which has not been touched for ten days, and one cannot tell whether it has had B.I.P. or not: the discharge looks like clean serum, and there is no odour. It is also difficult to judge by the colour. I have not seen a thick scar, such as would give one the idea that keloid was going to form. I think gauze should be used, sparsely smeared with the ointment, because it seems bad to use much B.I.P. With regard to what Mr. Stuart-Low said, we do not use it in France for accessory nasal sinuses, but some French and American surgeons, years ago, used bismuth in the antrum of Highmore, for antritis. With regard to poisoning, there has been a suggestion of that where the wound has been near the mouth, the idea being that some was swallowed: one case in our hospital died, from what might have been iodoform poisoning Where treatment is near the Eustachian tube, or the infundibulum, or the mastoid, this is a possibility to be borne in mind.

Dr. JOBSON HORNE: B.I.P. may be an excellent dressing for ordinary operations, but it is not safe to jump to the conclusion that what can be used with impunity in other parts of the body is also good for a special region such as the ear. It would therefore be better to confine our remarks to the effects of B.I.P. on cases in which a mastoid operation has been done. I cannot object to Mr. Stuart-Low's theory that the impaired hearing he detected in some of the cases exhibited is attributable to the bismuth. Years ago one saw cases which had been treated with bismuth in which impairment of hearing had followed. The line of incision in all the cases exhibited is further from the pinna than I find necessary to make. By keeping the left scar as close under the pinna as possible the result is equally gratifying to the surgeon and far more so to the patient. Regarding the point that the wounds, in the cases shown, had been "sutured entirely at the close of the operation," it would be wrong to lay down a hard and fast rule how any one operation on the mastoid is to be carried out in all cases, for no two mastoid cases are alike. The exceptional amount of scar tissue formed in the cases exhibited is in itself evidence of the septic and œdematous condition of the soft parts at the time of the operation, and that again is in itself sufficient reason for not suturing entirely the wound at the close of the operation. Possibly this treatment may be useful in exceptional cases, but the results, even if they do take a little less time, do not show any advance on those obtained by other technique.

Mr. RICHARD LAKE: I have used iodoform on every mastoid case I have done, without exception, and I have been doing these operations for quite a long time now. I have used it in frontal sinus cases as well. I will relate one case because, like others, I have, of course, made mistakes. A lady was brought to me with an acute mastoid condition. I opened it, and healing occurred in a short time. She came up to see me again, complaining of exactly the same symptoms. I did not examine her thoroughly, but told her to go straight into the nursing home, and I would come and operate on her there next day. When I took off the shell of the mastoid, there were the trabeculæ already formed, and lying in this, dry cells: there was no pus nor any inflammation, but there were the iodoform grains, which had remained there three or four years. I have no doubt that the lady, if she had been skiagraphed, would have shown the dark shadow to which Mr. Stuart-Low alluded.

Mr. SOMERVILLE HASTINGS: As all the cases which Mr. Tilley showed to-day are children, I would like to ask him the age of the oldest patient on whom he has operated by this method, and whether his results in adults are as good as those in children. I see the paste he uses is half iodoform, and I have wondered whether a smaller proportion would give results as good. My experience of B.I.P. has been limited to its removal from a good many parts of the body, including one mastoid, on which the operation was performed three months previously. The case was that of a soldier who was very ill with meningeal symptoms, and I opened up his mastoid freely and removed a mixture of bismuth paste and pus which I found there, in contact with the dura. The symptoms cleared up, and he is now well. He has been kept on the staff of the hospital where I am engaged, so that I have had the opportunity of seeing him since.

Mr. J. F. O'MALLEY: Ever since I have done mastoid operations, whether radical or otherwise, I have used iodoform emulsion: I think it was from Mr. Lake I got the idea. Latterly I have used B.I.P., but so far have only had a few cases.

Mr. HUGH JONES: I have used B.I.P. for twelve months for the radical operation. I find it so often gets between the flap and the underlying surface, interfering with healing, that I have now stopped using it for the operation dressing, at which I simply use gauze; and at the first dressing and afterwards when healing of the soft parts has taken place I use B.I.P.; this is an easier process than packing the cavity with gauze, which children resent. One sees many cases which have been operated upon by both skilled and unskilled surgeons, and we find a dead space. It is all very well to talk of filling up with granulations, but if you open up a mastoid which has been operated on in a perfunctory fashion, you will find a dead space. Whether B.I.P. is sufficient to take the place of a proper growth of tissue, I do not know. Whenever in doubt I have made an opening into the meatus and closed the posterior wound, in other words, done a "modified radical" operation. In two or three of Mr. Tilley's cases I would not have had the courage to close them up entirely at once: for instance, where the sinus was exposed, I should have made an opening into the meatus, then closed the posterior opening. I agree that the less B.I.P. is used—within limits—the better the results will be, and the more of it is used, the greater will be the interference with healing.

Dr. KELSON: It has been a distinct advance. When I was at a meeting in Edinburgh, years ago, one of the Scotch surgeons told me he did mastoid operations in the out-patient department and sent the patients home. We are not so advanced as that in London. I also noticed, as Mr. Hastings did, that the cases Mr. Tilley showed to-day were in children, also that they were acute cases, by which I understand there was no previous ear disease. That being so, I am not certain that in the hands of a skilled and experienced surgeon who was sure of removing all the disease and had the courage to close them up without any B.I.P. at all they might not have healed: and it does not prove that the trick was done by the iodoform. This drug was largely used thirty years ago, but it has been partly dropped for a long time because it did not yield uniformly brilliant results. We had, at the London Throat Hospital, a house-surgeon who thought he would cure all mastoid cases with iodoform, and dressed them all with it. Many of them did very well indeed. But I had later to say that in certain of my cases no iodoform was to be used, as it resulted in very exuberant granulations, and the discharge was blocked. When spirit drops were substituted, these cases did well.

Mr. MARK HOVELL: As Mr. Lake has strongly confirmed my impression that iodoform is not absorbed, and Dr. McKenzie and Dr. Kelson have drawn attention to the irritation which it produces, I think that skilled pharmacists might improve on the preparation now being used and produce something which would retain its good qualities and replace the iodoform by iodine in some other form.

Dr. JAMES DONELAN: Dr. Dan McKenzie touched the weak spot in the method, and some time there will be a concealed focus which will give trouble. I have had a case in which I had to remove bismuth from over such a focus. My experience of acute mastoids is not so large as of chronic cases. In the latter I have recently been in the babit at the end of the operation of filling the cavity with pure anæsthetic ether and gently swabbing it in all directions. Dr. Kelson's reference to spirit drops where bismuth and iodoform have failed, bears out the value of this idea. All the cases in which I have used ether have done very well. I do not use a post-auricular drain but a large $\frac{1}{2}$ in. tube in the widened meatus, and keep the patient as much as possible on the operated side. In uncomplicated cases this method has proved most satisfactory, and is well worth trying by those who have not used it. It is certainly much less messy and disagreeable than bismuth and iodoform.

Mr. W. M. MOLLISON: My experience with B.I.P. is very small. I tried it some months ago in children, but was very disappointed with the results. From what I have heard to-day it is probable I used too much: I put in as much as I could, and sewed up the wound. After hearing of Mr. Tilley's experience I shall certainly use it again.

Mr. TILLEY (in reply): I never cut a flap in an acute cortical mastoid operation; I have not seen occasion to do so. An important point in the use of this preparation as laid down by Professor Rutherford Morison, and as proved by some of my earlier cases and by my subsequent successes, is that one should not put in a mass of B.I.P., but use it rather as a smear. If you put in a large quantity, you may have to dissect out the bismuth afterwards, and there will be a discharge of iodoform granules from the drum perforation for some weeks after the operation. If you dry the wound and smear the parts fairly freely with the B.I.P., you will do the right thing. I agree with Dr. McKenzie, it does not kill the skin grafts when these are used in the radical operation. I must take exception to Dr. McKenzie's statement that when operating on acute cases you never can be sure you are at the end of the disease. Humanly speaking, you *do* know when you have dealt with all the suppurating cells, and certainly when the disease is extensive you have removed the whole mastoid, including the tip. So I do not think we need fear that there will be any complication following the use of this preparation and immediate closure of the wound—e.g., that the lateral sinus will become thrombosed because you have overlooked some focus of suppuration. I agree with Dr. McKenzie that, occasionally, wounds will be found to resent iodoform; there is a personal idiosyncrasy against iodoform. I take exception to Mr. Stuart-Low's statement that the cases I showed all have keloid; some of them have no trace of it. And a keloid scar has nothing to do with this particular method; one has often seen it when another or no antiseptic has been used. In a few months the keloid will get white and eventually disappear. I have not seen a case in which it caused any trouble whatever and in which it did not eventually shrivel down into a white scar. If keloid occurs in a lady who is very distressed about it, it can be got rid of by the application of radium. Mr. Stuart-Low also said that 25 per cent. of these cases have loss of, or defective, hearing. That is a misconception; they hear extraordinarily well. To three of the boys I spoke in a whisper, asking them an unexpected question, and the correct answer was prompt. It is misleading to say the cases shown hear worse than after the cortical operation without the use of B.I.P. I have not seen a case of iodoform poisoning in my own practice, but I saw one in the King George Hospital in which a patient had a yellowish-green membrane on the palate and extending to the inside of his cheek, and looking something like a large diphtheritic membrane. The mucous membrane bordering the membrane had a smoky aspect. It was a very puzzling case until the urine was tested, and then bismuth was found in it. After the B.I.P. was stopped, the membrane disappeared. With regard to age, most of my cases during the last six months have been in children, with the exception of one or two private patients and four soldiers. The best consistence of B.I.P. is that of ordinary cream. With regard to Mr. Hugh Jones's remarks on the granulation tissue, what I take to happen is this: When you have smeared your wound with B.I.P. and sewn it up, you get blood filling the mastoid cavity; the blood cannot decompose, and eventually you will get ordinary granulation tissue penetrating the aseptic blood clot. I recently performed an external operation on a chronic frontal sinus empyema on the right side. It became infected from the suppurating left sinus, and in three weeks' time I had to open up the latter. On examining the right sinus, I found the granulations were pale and of tough consistence, unlike the granulations I have seen in any other bony wound. That was the only occasion on which I have had occasion to open up a wound after B.I.P. has been used. Dr. Kelson mentioned some points about immediate closure of the wound. If I had not had complete faith in the antiseptic, I would not have dared to close the wound at once in some of these cases with excessive œdema. Three of my patients had a "bacon-rind œdema" ½ in. thick, but after my earlier cases I had such confidence in B.I.P. that, after thoroughly cleaning and drying the wound, I smeared it with the antiseptic cream and closed the wound, and I propose to continue the practice until I come across that inevitable case of a "hidden pocket," which Dr. McKenzie speaks of. I hope members will give the method a trial and report their experience to the Section.

Case of Chronic Suppuration of the Middle Ear and Cholesteatoma treated by Radical Mastoid Operation, with Retention of the Cholesteatoma Matrix.

By J. Dundas Grant, M.D.

The patient, a young married woman, was first seen by me on April 12, 1918. She had suffered with ear disease since childhood and was now subject to attacks of giddiness with headache. On the removal of a crust hiding the upper part of the membrane it was found that there was erosion of the outer wall of the attic and probably of the bony casing of the labyrinth as the result of cholesteatoma. The postero-superior part of the cavity was filled with epithelial débris and a mass was extracted; she was ordered drops of equal parts of rectified spirits and carbolized glycerine. The attacks of vertigo diminished, but recurred as the cholesteatomatous desquamation proceeded. I, therefore, did the *radical mastoid operation* on May 18. The "bridge" had already been eroded away. I cleared out the desquamative débris very carefully so as not to destroy or dislodge the matrix, which was fairly white and sufficiently homogeneous and adherent to pass muster as a skin-graft. I dried it carefully with alcohol and introduced a plug of gauze moistened with iodoform emulsion. A Ballance flap was cut and fastened back by means of a stitch of silk-worm gut passing through the posterior lip of the operation wound. The plug was removed in four days' time; the parts were found to be exceptionally dry, the matrix was adherent and has been daily mopped with biniodide and pure spirit. At the present time (May 31) it forms a yellowish-white lining to the postero-superior part of the cavity, but of course the bare surface of the osseous "ridge" is not quite covered with the young velvety granulations, though at the margin of the raw surface epithelialization is already taking place.

DISCUSSION.

Mr. W. Stuart-Low: I assisted Dr. Grant in many of these cases in the hospital years ago, and I have made it a practice to do the same thing myself when the lining is evident and shiny. The result is exceedingly good, both as regards recovery from the operation and restoration of hearing.

Mr. MARK HOVELL: Is there any special advantage in iodoform over other iodine preparations? In course of time, the other iodine preparations will become absorbed and disappear, whereas my experience is that iodoform does not disappear.

Mr. HUGH JONES: Dr. Grant mentioned that in this case the bone forming the so-called bridge was already destroyed by the pathological processes. I think several cases of this kind have been shown at this Section—and one sees them from time to time in practice—in which a natural complete radical mastoid operation has been done. Does Dr. Grant think such cases are peculiarly suitable for treatment by this method?

Dr. KELSON: Does Dr. Grant find this method of treatment permanently cures the trouble? When, some years ago, he advocated it at the Otological Society, I tried it in some cases, but in the majority of them, when the spirit drops were stopped, the discharge came on again soon afterwards.

Dr. JOBSON HORNE: It would be premature to express an opinion upon the result of this case. The reason of any difference of opinion as to the advisability of leaving *in situ* the lining membranes of a cholesteatoma is easily explained. The term "cholesteatoma" is regarded in a different sense by different persons. A true, typical cholesteatoma is a very rare, but very definite, pathological process in the mastoid bone. To leave the lining membrane when operating upon a true cholesteatoma could not, from the very nature of the disease, bring about a cure; on the contrary it would promote a recurrence. If, on the other hand, the term "cholesteatomatous" is to be applied to cases having only a most remote resemblance to a true cholesteatoma, then it does not matter very much what is left behind as a lining membrane.

Dr. DUNDAS GRANT (in reply): It is not very unusual to see the bridge and the outer wall of the attic eroded away as the result of the development of cholesteatoma. I think such cases are generally suitable for retention of the matrix, and the results have been permanent. I ask you to assume for the moment that it is long-standing mechanical pressure which causes the erosion of bone, and that it is only in long-standing and neglected cases that "cholesteatoma" with a well developed matrix has a chance of forming. We see fewer of such cases now than formerly, when they were more neglected. (I am, of course, not referring to the genuine cholesteatoma neoplasm.) I shall show this case again at the next meeting.

Case of Orchitis and Deafness.

By Dan McKenzie, M.D.

A male, aged 62, came to consult me on March 12, 1918, with the following history: A few weeks previously he had been attacked with "influenza," which necessitated his keeping in bed for several days, the temperature rising to 104° F., and there being general muscular aching, but no headache, and none of the symptoms of "cold." A week after he had recovered from this attack and had gone back to business, he woke up one morning to find that he had gone absolutely deaf in the right ear. There had been no previous indication of any ear trouble; no tinnitus; no discharge. And there never had been any vertigo, either before or since the deafness appeared.

On examination, the patient's statements were confirmed; the hearing in the right ear was entirely abolished, that in the left ear being normal. The tuning-fork on the mastoid of the right (the deaf) ear was referred to the left ear. With the noise-machine in the left ear, however, he thought he could hear the tuning-fork on the right mastoid "for a moment." There was slight spontaneous nystagmus on looking to either side, more noticeable toward the left (the sound) ear. But it could not be called abnormal in degree. The caloric reaction was normal. With cold water (22° C.) nystagmus appeared in 35 seconds, and was accompanied with normal vertigo.

Close cross-examination failed to shake the patient's conviction that the deafness had appeared for the first time on the occasion he had first observed it.

The patient's very natural anxiety was to know whether the left ear was likely to go suddenly deaf as the right had done. But I could not venture upon any opinion until he casually let fall the remark that during the "influenza" his testes had become enlarged and tender for a few days, one after the other. There was nothing in his past or present history to account for this orchitis, which had passed away without any local sequela, any more than there was anything to explain the onset of sudden and complete deafness. But it occurred to me that he had been attacked with the virus of mumps which, as it is known occasionally to do, had spared the salivary glands but had set up orchitis, and that what we had to deal with was probably nerve deafness from mumps. I therefore confidently assured my patient that the hearing in his sound ear would not be suddenly blotted out as that in the right had been.

Deafness in mumps is not infrequently unilateral, and its onset, though sudden, is unaccompanied by vertigo. The nature and situation of the lesion in mumps deafness is unknown, it would seem, but the virus evidently selects the acoustic and spares the vestibular element of the auditory-canalicular apparatus.

In view of the above case, the possibility of sudden deafness following ovaritis becomes obvious.

DISCUSSION.

Mr. SOMERVILLE HASTINGS: The case is useful to many of us, because cases which often cause great difficulty are those of internal ear deafness, sometimes unilateral, in which a cause cannot be found, many of which come on suddenly. In future I shall always ask whether there has been swelling of the testicle in these obscure cases.

Mr. W. M. MOLLISON: In cases of unilateral deafness of rapid onset, toxic absorption is doubtless often the cause. One always asks for a history of mumps, but a very small proportion of patients with unilateral deafness have mumps. I think in this case the orchitis is an expression of mumps. The origin of the toxic absorption is not known in most cases. Many of the cases which we call nerve deafness in elderly people are possibly due to toxic absorption, and I am gradually coming to the opinion that the teeth have a good deal to do with it. Among hospital patients one sees an enormous number of people with very septic teeth, and many of them have what we call nerve deafness, that is to say, a toxic deafness. In swiftly oncoming deafness we have to look for some source of infection, and I think Dr. Watson-Williams is on the right track when he suspects the sphenoidal sinus. It has been said that if unilateral deafness is due to a toxic absorption, there is no reason why it should not get well. I have recently seen a case which shows that recovery can occur. The patient was a man who had been seen, I think, by Mr. Tilley, also he was almost entirely deaf in the right ear, and independently we both gave a hopeless prognosis. He came back to me after six months, with the hearing perfect on that side.

Mr. J. F. O'MALLEY: Cases of unilateral laryngeal paralysis occur in which no physical lesion can be ascertained. It is well known that certain toxic substances affect certain nerves: tobacco, in some people, has a particular influence on the optic nerve. There is no reason why certain substances should not affect the cochlear. It is difficult to get evidence to substantiate the statement, but one makes the diagnosis of a toxic condition.

The PRESIDENT: A sister at a London hospital suddenly went giddy and became very deaf, and I was asked to see her. She had lost a good deal of hearing. Two days later she was so much worse that she was unable to hear anything at all in that ear. She had intense tinnitus. The onset was so sudden that I hoped it might be hysterical. On my advice she went away for a month, but returned no better. She saw another aurist, and a very hopeless view was taken of the case. However, her hearing has now largely come back, though it is not so good as before the attack. I do not know what the explanation was, but the moral is, not to be too certain that these people will not recover hearing.

Dr. KELSON: I have seen a few such cases, and I would like to know from Dr. McKenzie what prognosis he gave. My experience is that this deafness from mumps is a distinct entity, and with a bad prognosis; and that if they do not recover in six months they are deaf for ever. If deafness persists on both sides, there is not much to be done for them but lip-reading.

Dr. DAN MCKENZIE (in reply): An interesting question has been raised in regard to unilateral deafness due to toxins. There are toxic conditions which affect one side only. One is apt to think that if it is bilateral it is due to a general condition. But otosclerosis, a bilateral disease, is very probably due to a local condition or cause. There is no rule in that regard: we must find out everything individually, in detail. Labyrinthine deafness is the "Darkest Africa" of medicine, not only of otology, but of all medicine: there is less known about what we call nerve deafness than about conditions in any other part of the body. As Mr. Mollison says, a large number of the cases are due to a toxin which has a specific action on the auditory nerve or the cochlear ganglion, inducing a lesion which causes deafness. I agree with Dr. Kelson that most cases of mumps deafness are permanently deaf. My preceding patient on the morning that man came to me was a little child, but there was no history throwing light on the cause. It was unilateral nerve deafness, and I could not say whether she would get well. In the man's case the cause was cleared up.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY

J. Y. W. MacALISTER

UNDER THE DIRECTION OF

THE EDITORIAL COMMITTEE

VOLUME THE ELEVENTH

SESSION 1917-18

SECTION OF PATHOLOGY

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1918

Section of Pathology.

OFFICERS FOR THE SESSION 1917-18.

President—

W. Bulloch, M.D., F.R.S.

Vice-Presidents—

W. S. Lazarus-Barlow, M.D.
J. C. G. Ledingham, C.M.G., M.B.

Hon. Secretaries—

Gordon W. Goodhart, M.B.
J. A. Murray, M.D.

Other Members of Council—

F. W. Andrewes, M.D., F.R.S.
F. A. Bainbridge, M.D.
C. H. Browning, M.D.
H. H. Dale, M.D., F.R.S.
H. R. Dean, M.D.
J. F. Gaskell, M.B.
M. H. Gordon, C.M.G., M.D.
R. T. Hewlett, M.D.
P. P. Laidlaw, B.C.
J. Henderson Smith, M.B.
B. H. Spilsbury, M.B.
H. M. Turnbull, M.D.

Representative on Library Committee—

W. Bulloch, M.D., F.R.S.

Representative on Editorial Committee—

S. G. Shattock, F.R.C.S., F.R.S.

SECTION OF PATHOLOGY.

CONTENTS.

December 4, 1917.

W. S. Lazarus-Barlow, M.D. PAGE

An Attempt at the Experimental Production of Carcinoma by Means of Radium 1

April 16, 1918.

E. H. Kettle, M.D.

Tumours arising from Endothelium 19

J. B. Christopherson, M.D.

Osteomalacia Sclerotica—"Boomerang" Bones, Corkscrew Bones—the so-called "Boomerang" Leg; Sclerosing Panosteitis of the Long Bones preceded by Softening and Plasticity, and resulting in Considerable Deformity 35

S. G. Shattock, F.R.S.

Disruptive Phenomena in Gunshot Injuries 47

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

London:

John Bale, Sons and Danielsson, Ltd.,
Oxford House,
Great Titchfield Street, Oxford Street, W. 1.

Section of Pathology.

President — Dr. Bulloch, F.R.S.

(*December* 4, 1917.)

An Attempt at the Experimental Production of Carcinoma by Means of Radium.

By W. S. Lazarus-Barlow, M.D.

(Director of the Cancer Research Laboratories, The Middlesex Hospital.)

The experiments upon which the present communication is based were commenced in May, 1912, and have been carried on continuously since then. It will be seen that the results are encouraging but still incomplete. Nevertheless it was thought advisable to place them on record in order to save other investigators on the same lines from a large amount of preliminary work.

In the Eleventh Report from these laboratories (1912, p. 91), I brought forward evidence that carcinomatous tissues in man frequently contain radium in quantities of the order 10^{-8} mg. Further, on p. 114 of the same Report, and on p. 87 of the Twelfth Report (1913), I showed that gall-stones in cases of primary carcinoma of the gall-bladder contain relatively considerable amounts of radium, whereas gall-stones in cases of carcinoma at other sites or in the absence of malignant disease altogether, contain far smaller quantities of radium, or presence of the element is unrecognizable. These facts, taken in conjunction with the admitted production of carcinoma by X-rays, indicated the types of experiment and the quantities of radium to be used in the initial attempts, and the investigation consisted in placing radium beneath the skin of rats and into the gall-bladders of rabbits.

A considerable number of experiments may be dismissed very shortly. My first attempt consisted in depositing radium in the form of sulphate upon powdered glass and injecting this beneath the skin of mice, the quantity of radium per mouse varying in different series of animals from 10^{-8} mg. to 10^{-4} mg. Later, another series of mice was inoculated with radium deposited in the form of silicate upon powdered mica, the quantities of radium being approximately the same as in the previous series. The technique was difficult, the animals not easy to keep alive over long periods, and the radium, although introduced in a very insoluble form, was found to disappear with some rapidity (Twelfth Report, 1913, p. 92).

Combining both series, 193 mice were inoculated with radium, and of these sixty-seven were living after six months. These sixty-seven yielded five definitely malignant mice bearing six tumours, and, in addition, seven mice bearing doubtful tumours (one papilloma and six nodular masses, chiefly in the neck, as large as peas, oscillating in size and finally disappearing). Thirteen controls inoculated with glass or mica without radium also survived six months and showed no tumour formation of any sort. The sites of the tumours bore no obvious relation to the site of injection of the radium.

It was then decided to confine the radium in minute glass tubes the walls of which were sufficiently thin to exclude little more than the alpha radiation, and to use rats. The tubes measured about 3 by 1 mm. and were sealed at both ends after introduction of the radium. In the case of quantities of the order of 10^{-2} mg. and less, tubes of measured capacity were filled with the appropriate radium solution by capillarity, the contents evaporated to dryness by gentle heat and the tubes were then sealed at each end in the flame. In the case of quantities of radium greater than this the solid radium salt was used. Estimation of the amount of radium was made by means of the gamma-ray electroscope in the case of individual tubes where the amount was of the order 10^{-3} mg. or more. Tubes containing smaller amounts than 10^{-3} mg. were assumed to contain the desired quantities since they were of measured capacity and were filled with solutions of radium bromide carefully made and titrated by means of the alpha-ray electroscope. The quantities of radium element in the entire series of tubes increased in geometrical progression (the factor being 2) from 3×10^{-8} mg. to 3×10^{-4} mg. Owing to the absence of recognizable histological changes with these small quantities tubes were prepared with amounts of radium increasing to a maximum of 0·15 mg. of radium calculated as element.

In the gall-bladder of rabbit experiments, actual gall-stones removed from a human subject at an autopsy were used. The calculi were of the ordinary cholesterin type, very numerous, uniform in size, irregularly cuboidal and about 4 mm. in diameter. Special examination of a sample by means of the alpha-ray electroscope had determined that no radium was recognizable in them. A small hole having been bored into the centre of several with a hot needle, a measured quantity of one of the radium silicate on mica suspensions was introduced into them, and after the liquid had dried completely the opening in the calculus was sealed with cholesterin liquefied by heat. Each gall-stone was designed to contain 1×10^{-6} mg.; one such calculus estimated by the alpha-ray electroscope showed the presence of 4×10^{-6} mg. As will be seen from consideration of the actual amounts of radium found in the gall-stones after death of the individual rabbits it appears that the radium in these gall-stones underwent a gradual disappearance as was the case when the substance was deposited in insoluble form beneath the skin of mice (cf. supra).

EXPERIMENTS ON THE SKIN OF RATS.

The radium tubes were introduced beneath the skin in the axillary region by means of a Bashford trocar and cannula. One hundred and twenty-two rats were so treated with quantities of radium varying from 10^{-5} mg. to 10^{-3} mg. Minimal recognizable effects, consisting in falling out of the hair over the situation of the tube, were observed in two animals which had been subject to the rays from 6×10^{-4} mg. (estimated) for forty-four days and $1 \cdot 5 \times 10^{-3}$ mg. (determined by gamma-ray electroscope) for fifty-seven days respectively. The other animals in the series showed no changes. Larger quantities of radium produced increasing effects and the histological changes of skin considered in this section are the effects of radium (calculated as element) in quantities varying from $1 \cdot 5 \times 10^{-3}$ mg. to $1 \cdot 5 \times 10^{-1}$ mg., or roughly from one-thousandth of a milligram to one-seventh of a milligram. Fifty-three rats were treated with these larger quantities.

Changes taking place in the skin were always ushered in by the formation of a local swelling around the tube, followed by falling out of the superficial hair. This was succeeded by the formation of an ulcer, oval in shape, a little less extensive than the swelling and covered by a scab. The extent of these changes and the length of time necessary for their production were factors of the amount of radium present in the animal concerned. Thus, the rat with $1 \cdot 09 \times 10^{-1}$ mg. showed wide removal of hair on the fifteenth day after introduction of the tube, and a lumpy scab on the nineteenth day; the rat with $6 \cdot 6 \times 10^{-3}$ mg.

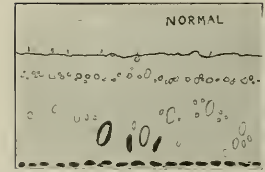


Fig. 1.

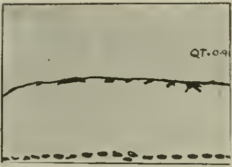


Fig. 2.

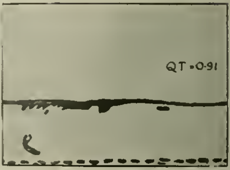


Fig. 3.

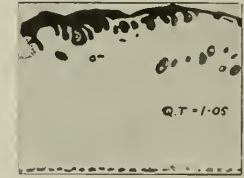


Fig. 4.

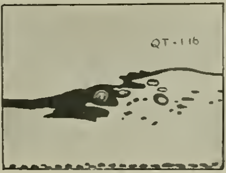


Fig. 5.

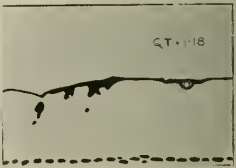


Fig. 6.

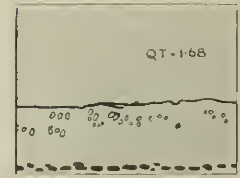


Fig. 7.

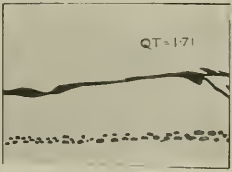


Fig. 8.

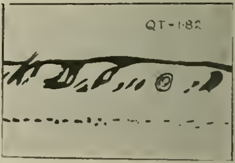


Fig. 9.

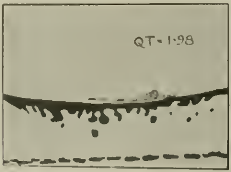


Fig. 10.

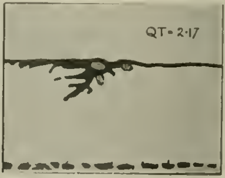


Fig. 11.

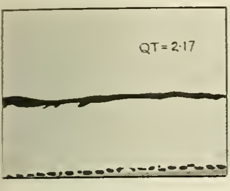


Fig. 12.

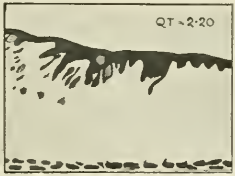


Fig. 13.

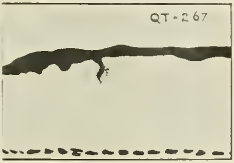


Fig. 14.

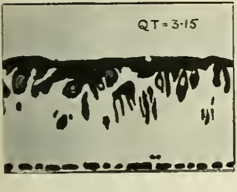


Fig. 15.

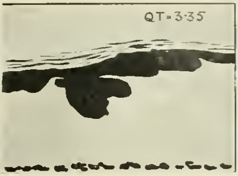


Fig. 16.

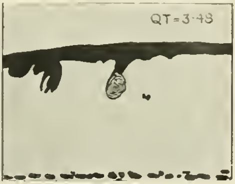


Fig. 17.

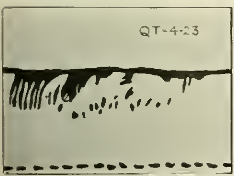


Fig. 18.

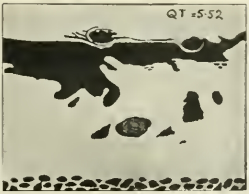


Fig. 19.

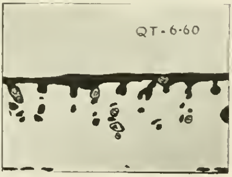


Fig. 20.

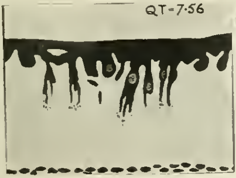


Fig. 21.

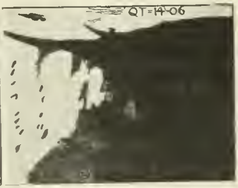


Fig. 22.

showed slight thinning of hair over the tube on the tenth day after its introduction, definite thinning on the twenty-eighth day, a bare patch and scaliness on the forty-ninth day, and never reached to ulceration and the formation of a scab at all.

On the death of the animal the affected region was removed, pinned out on cork, hardened in acetic alcohol and embedded in paraffin. Sections were cut, at right angles to the surface, from the centre of the affected region to well beyond it, and stained in the usual ways. When the site of maximum overgrowth of skin had been determined its outline was drawn (as seen in a single field of the microscope with a $\frac{2}{3}$ in. objective and a No. 3 eyepiece—i.e., by 85 diameters). These drawings were then blackened in to produce the silhouettes shown in figs. 1 to 22.

In many instances the tube ulcerated out. Some of the animals in which this occurred were examined forthwith, others were allowed to live in order to determine the subsequent course of the ulcers. It may be stated here that healing always took place with some rapidity but the scar, though covered with a thin layer of epidermis, never developed hair follicles, and a bald area always persisted. Though watched for months such a region was never seen to undergo any further change.

The series of silhouettes shows (1) that the radium has led to an increase in thickness of the epidermis in all cases; (2) that this thickness of epidermis varies, roughly, in direct ratio with the factor QT by which is designated the product of the quantity of radium and the number of days in which it was in position, or, in other words, the total amount of radiation to which it was subjected; (3) that whereas the lower level of the epidermal layers in the normal animal is parallel to the outer layer and no downgrowths of epidermis occur, in the radiated animals, on the contrary, irregular downgrowths frequently occur; (4) that, in the radiated animals hair and hair follicles have completely disappeared; and (5) that several of the epithelial downgrowths show the presence of appearances indistinguishable from those of the "cell nests" of squamous cell carcinoma (cf. figs. 4, 5, 6, 9, 11, 13, 15, 17, 19, 20, 21, 22).

The site of maximum overgrowth of epidermal layers varied in reference to the position of the tube, being at a greater distance as the amount of radium contained within the tube was greater, and vice versa. From this it would appear that there is an optimum degree of stimulation by the rays for the multiplication of the cells, since the intensity of radiation falls off, approximately, according to the law of inverse squares. The time factor seems to manifest itself in two ways. When the amount of radium is of the order 10^{-2} mg. or less, the amount of epithelial overgrowth varies, roughly, as the length of time; when the radium is present in larger quantity each successive focus of epithelial stimulation becomes merged in the advancing area of cell destruction. This is well seen in fig. 22, where the large black area does not represent living epithelial cells but degenerated material, the former composition of parts of which is indicated by the cell nests embedded in it. This is but another example of the well recognized fact that a stimulus which leads to proliferation of cells, if acting for a certain length of time, leads to degeneration if its action be prolonged. That such a result is particularly likely to occur when radium is the stimulus is indicated by the experiments of Mottram (Twelfth Report from these Laboratories, 1913, p. 112), who showed that the animal cell, as exemplified by the ova of *Ascaris megalocephala*, is at least eight times as vulnerable to the beta *plus* gamma rays of radium in the dividing as in the resting stage of its nucleus.

Immediately around the radium tube degeneration of tissue was complete and signs of inflammation were conspicuously absent. Outside the zone of epithelial overgrowth the epidermis gradually merged into a normal condition, but complete absence of hair and hair follicles extended for a variable distance beyond the zone of epithelial overgrowth. In no instance, except possibly that represented in fig. 22, did the epithelial downgrowth invade the subjacent muscular layer.

EXPERIMENTS ON THE GALL-BLADDERS OF RABBITS.

Gall-stones were introduced into the gall-bladders of nine rabbits. Of these, three were controls, the gall-stones containing no radium. Six were experimental, the gall-stones used for introduction into their gall-bladders having previously been impregnated with radium artificially. The control animals died, respectively, two months, twelve months, and thirty-eight months after the operation. The experimental animals died, respectively, twelve months, sixteen months, seventeen months, twenty-two months, thirty-seven months, and forty-eight months after operation. The operations were carried out under A.C.E. mixture, and with strict aseptic precautions. The wounds healed by first intention, and recovery was rapid and quite uneventful.

After death a careful autopsy was made. The gall-bladder, which had usually become imbedded in the substance of the liver, was removed with a small amount of surrounding substance and placed in preservative. Portions of liver, kidney and lungs, with any suspicious nodules, were preserved for microscopical examination. After hardening of the mass containing the gall-bladder the latter was carefully opened and the calculus removed for subsequent examination as to presence or amount of radium by means of the alpha ray electroscope. The gall-bladder itself, with attached liver substance, was then cut into pieces of suitable size and embedded in paraffin for microscopical examination.

Below is given a short description of the microscopical appearances in each case.

Control Rabbits.

Control 1.—Capsule of gall-bladder much thickened and consisting of dense fibrous tissue. No columnar epithelium present. A small amount of débris in the cavity in addition to the calculus. Bile-ducts, blood-vessels, liver cells and connective tissue normal. Animal lived two months after operation. No radium found in gall-stone.

Control 2.—Capsule of gall-bladder irregularly thickened and consisting of dense fibrous tissue. Epithelium papillomatous, well preserved and staining well. The papillomatous epithelium projects into the cavity of the gall-bladder and nowhere invades the wall. Much mucus present. Liver normal, no proliferation of epithelium in the bile-ducts, no increase in connective tissue. Animal lived twelve months after operation. No radium found in gall-stone.

Control 3.—Capsule of gall-bladder greatly thickened and consisting of dense fibrous tissue; cavity occupied by pultaceous débris. Columnar epithelium in a single layer recognizable with certainty in many places but the nuclei are degenerated. There is no trace of irregular proliferation of epithelium. Multiple necrotic foci and general increase of connective tissue in the liver substance. Slight inflammatory small cell infiltration around the bile ducts, the lining epithelium of which is good. No signs of inflammation around gall-bladder. A dilated, thickened and much enlarged bile-duct with pultaceous contents closely resembles the altered gall-bladder. Animal lived thirty-eight months after operation. Calculus pultaceous and not recoverable.

Experimental Rabbits.

Rabbit A.—Capsule of gall-bladder much thickened and consisting of dense fibrous tissue. Epithelium proliferated and invading the wall of the gall-bladder in the form of tortuous irregular tubules lined with well-preserved columnar epithelium. Small cell infiltration in advance of the invading epithelium. Increased amount of connective tissue around the bile-ducts, of which the epithelium is, in the main, normal, but shows intracanalicular proliferation in places. Tubular adenomata

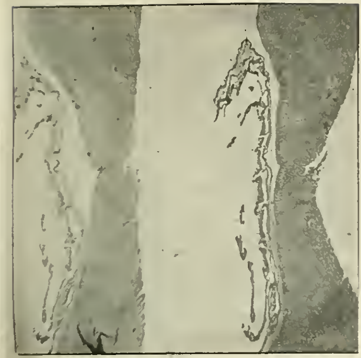


FIG. 23.

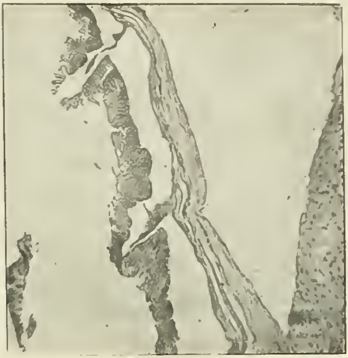


FIG. 24.

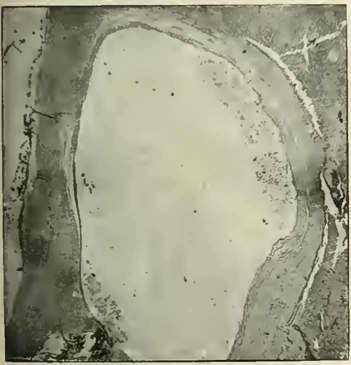


FIG. 25.

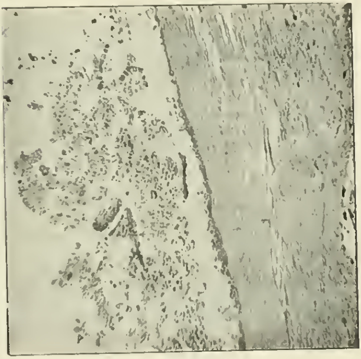


FIG. 26.

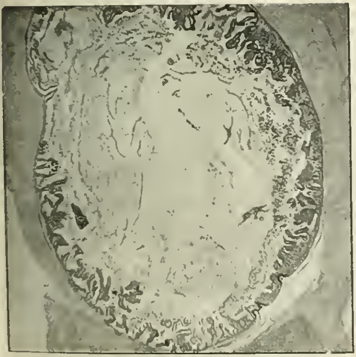


FIG. 27.

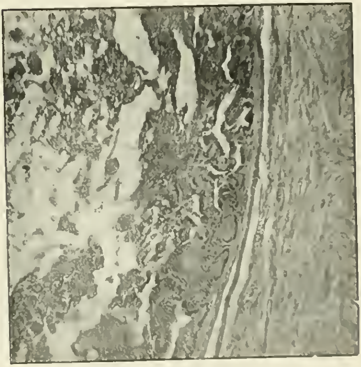


FIG. 28.

present throughout the liver in considerable numbers, but the hepatic substance is otherwise normal. A single focus of tissue consisting of irregular tubules lined with columnar epithelium and set in fairly dense fibrous tissue is present beneath the capsule of the liver in close relationship with the pancreas. It resembles the invading epithelial formation in the gall-bladder in arrangement and in character of cell. Animal lived twelve months after operation. Gall-stone contained $1{\cdot}4 \times 10^{-8}$ mg. of radium calculated as element.

Rabbit B.—Capsule much thickened and consisting of firm fibrous tissue. Epithelium polypose over the greater part of the interior of the gall-bladder, but at one place there is considerable proliferation and invasion of the capsule, with irregular tube-like formations, which are grouped irregularly owing to the presence of intervening strands of fibrous tissue. Small cell infiltration in advance of the invading tubules and in the intervening connective tissue as well as in the loose connective tissue underlying the polypose prolongations of columnar epithelium lining the remainder of the gall-bladder. Epithelial cells and nuclei are good in both gall-bladder and ducts. Liver substance normal except for the existence of some increase of connective tissue throughout. Animal lived sixteen months after operation. Gall-stone contained $2{\cdot}4 \times 10^{-8}$ mg. of radium calculated as element.

Rabbit C.—Capsule irregularly thickened, but not so greatly so as in some other instances. Wall consists of very dense fibrous tissue. Epithelium mostly shed, but papillomatous in places and very irregular. Wall of gall-bladder invaded in two regions, where are large alveoli containing disorganized columnar epithelium. No small cell infiltration recognizable. Epithelium of ducts good, but there is a tendency to proliferation and desquamation. Liver substance normal, no increase of connective tissue. Animal lived seventeen months after operation. Gall-stone contained $7{\cdot}3 \times 10^{-8}$ mg. of radium calculated as element.

Rabbit D.—Capsule considerably thickened, the fibrous tissue of which it is composed being dense and smooth externally but looser and more irregular internally. There is no normal epithelial lining to the gall-bladder, but the presence of columnar epithelium, lining irregular and ill-formed tubules, is noted throughout the greater part of the thickened gall-bladder. Between the invading tubules the loose connective tissue of the gall-bladder shows a moderate small cell infiltration. The liver is profoundly altered. There is a great fibrosis of the atrophic cirrhosis type, but the meshes are small, and fine strands of fibrous tissue pass between small groups of liver cells. Numerous necrotic areas are present, in which bacteria can be demonstrated. The

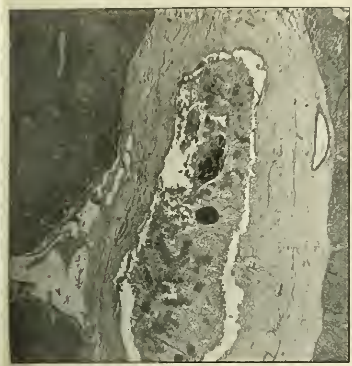


FIG. 29.

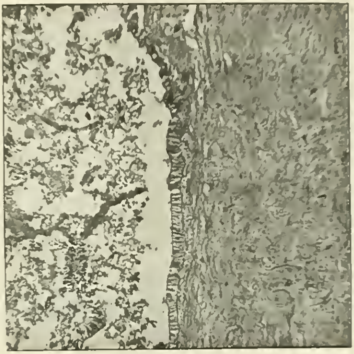


FIG. 30.

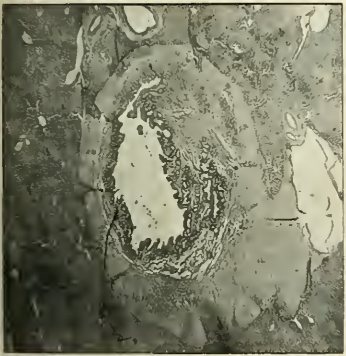


FIG. 31.

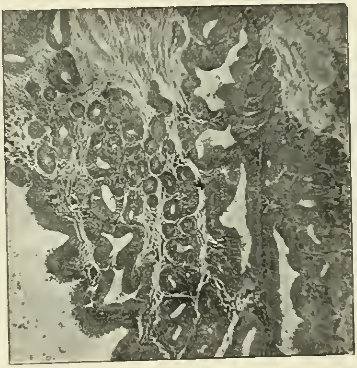


FIG. 32.

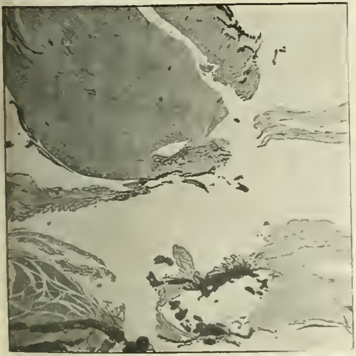


FIG. 33.

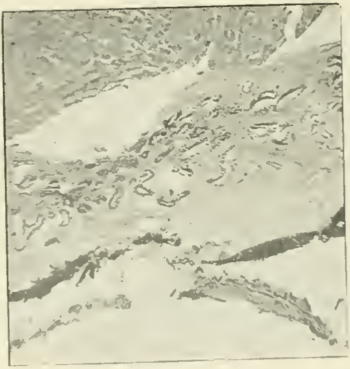


FIG. 34.

cells of the bile-ducts are very greatly proliferated and desquamated. There appears to be an actual proliferation of bile-ducts. Animal lived twenty-two months after the operation. Gall-stone contained $2{\cdot}1 \times 10^{-8}$ mg. of radium calculated as element.

Rabbit E.—The wall of the gall-bladder is fibrotic and thickened, but not so greatly so as in some other specimens. The epithelium lining the cavity is partly present, and in places is papillomatous, proliferated and degenerated, and here the subjacent connective tissue is infiltrated with a fair number of small round cells. Inflammatory cells in the ordinary sense are absent. At one place great invasion has taken place, many alveoli of various sizes and consisting of various numbers of irregular tubules lined with columnar epithelium extending through nearly the entire thickness of the capsule. The cells lining the tubules are degenerated, but there is no doubt as to their columnar nature. The largest of these alveoli shows the presence of mucus with admixture of calcareous débris. There is an increase in the amount of connective tissue in the liver, and inflammatory cells are present, but the liver substance itself is broken up to such an extent by the defective preservation (due to the disorganization of the laboratory caused by the War) that reliable statement cannot be made thereupon. Animal lived thirty-seven months after operation. Gall-stone contained $3{\cdot}7 \times 10^{-8}$ mg. of radium calculated as element.

Rabbit F.—Capsule of gall-bladder greatly thickened and consisting of practically acellular fibrous tissue. Epithelium partly normal, and partly proliferated and polypose, and resting on a looser connective tissue that is moderately infiltrated with small round cells. Two or more foci of invasion of the fibrous tissue of the capsule by tubules lined with columnar epithelium. At one spot a collection of thirteen transverse sections of tubules of different sizes and shapes is seen to lie in the midst of the fibrous tissue of the capsule and to be surrounded with a thin zone of small round cells. Some fibrosis around the bile-ducts in the liver, but no fibrosis of the liver itself. Foci of degeneration are present in places, and are, apparently, dependent upon vascular changes as the necrotic areas lie in or around blood-vessels. These necrotic foci are visible to the naked eye. No metastases were found. The epithelium of the gall-bladder in this case shows the least departure from the normal amongst the experimental rabbits (A-F), but differs from the normal and from the control rabbits in the presence of definite irregular proliferation and invasion of the thickened gall-bladder by alveoli, consisting of irregular tubules with columnar-cell lining. Animal lived forty-eight months

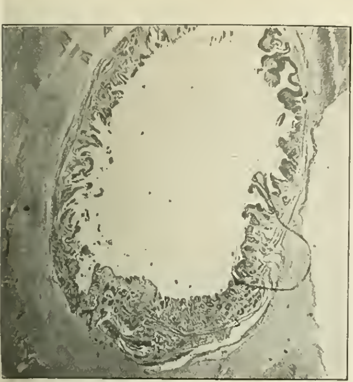


FIG. 35.

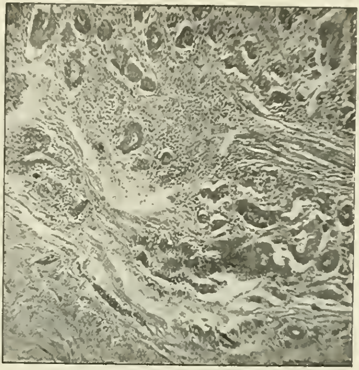


FIG. 36.

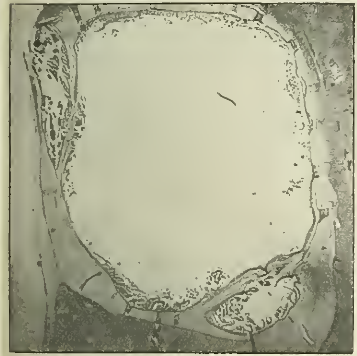


FIG. 37.

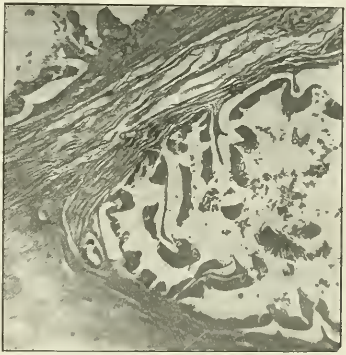


FIG. 38.

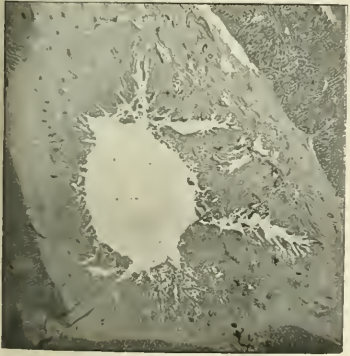


FIG. 39.

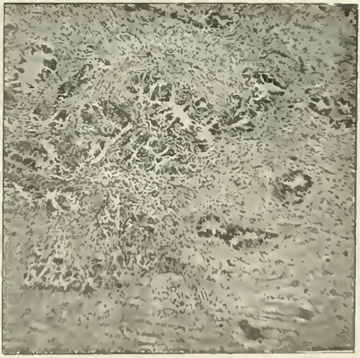


FIG. 40.

after operation. Gall-stone lost, and the terminal content of radium, therefore, unknown.

DISCUSSION OF RESULTS.

Whatever view may be taken as to the nature of the changes that have been described it is impossible to escape from three conclusions: (1) That a glass tube containing a sub-minimal amount of radium causes no appreciable change in the skin or subcutaneous tissue of the rat, and that a gall-stone containing no radium leads to a fibrous thickening of the gall-bladder wall and such degenerative or slightly proliferative changes in epithelium as might be expected to result from the presence of a simple foreign body; (2) that the presence of an effective amount of radium is associated with the occurrence of irregular proliferative epithelial changes, squamous in the case of the skin, columnar cell in the case of the gall-bladder; and (3) that the epithelial changes, whatever their nature, were not sufficiently extensive to prove fatal as cancer does in the human subject.

As to the nature of the changes, if undue proliferation of squamous epithelium in the skin with the occurrence of epithelial downgrowths and of "cell nests" constitute squamous-cell carcinoma, and if irregular proliferation of columnar epithelium in the gall-bladder with the formation of irregular tubules which invade the deeper-lying parts constitute columnar-cell carcinoma, then it is difficult to resist the conclusion that squamous-cell carcinoma has been produced in the skin of the rat and columnar-cell carcinoma in the gall-bladder of the rabbit by means of radium. The existence of a focus at a distant part of the liver in rabbit A, which is completely unlike any constituent of liver tissue and reproduces faithfully the appearances met with in the gall-bladder of the same rabbit, and of all the other rabbits in whose gall-bladders radium-containing calculi were experimentally placed, is strong evidence (1) that the focus in question is a metastasis, (2) that the condition in the gall-bladder of rabbit A is columnar-cell carcinoma, and (3) that the gall-bladders of the other rabbits in the same series (B, C, D, E, F) are also the seat of columnar-cell carcinoma. Such a view is compatible with the histological appearances. Even judged from the basis of morbid histology in man, I submit that the appearances represented in figs 4, 13, 15, 19 and 21 indicate a very early condition of squamous-cell carcinoma and that the appearances represented in figs. 32, 36, 40 and 42 indicate an early condition of columnar-cell carcinoma.

The differences in quantity of radium necessary to induce epithelial changes in the two situations is great (skin of rat 10^{-2} mg., gall-bladder of rabbit 10^{-6} mg.) and both quantities are far greater than that met with in carcinoma of man (10^{-8} mg.) or capable of accelerating cell division in ova of *Ascaris megalocephala* (5×10^{-7} mg.). It is probable that these differences indicate that some varieties of cell react more readily to radium rays than others, not only in different species of animals but even in the same species. I have shown (Thirteenth Report, 1914, p. 34) that this is true for squamous and columnar epithelium in rats. Nevertheless it must be remembered that in the

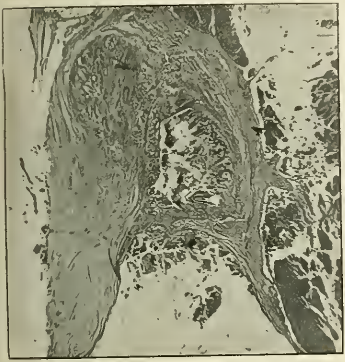


FIG. 41.

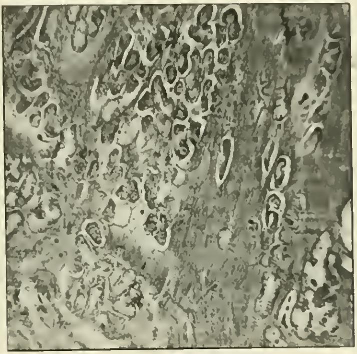


FIG. 42.

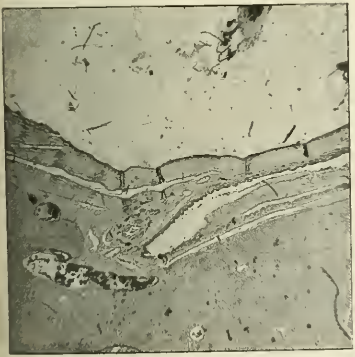


FIG. 43.

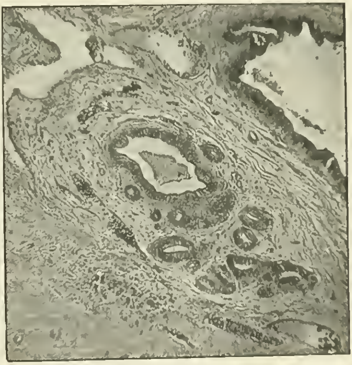


FIG. 44.

experiments on skin of rat detailed above, the radium factor differs from those on gall-bladder of rabbit and those on ova of Ascaris by the fact that in the rat skin experiments action of alpha rays was excluded owing to enclosure of the radium in glass tubes. The relatively large amount of radium necessary to induce squamous epithelial changes in the rat seems to suggest that it is not a suitable animal for the easy experimental production of carcinoma.

DESCRIPTIONS OF FIGURES.

Fig. 1.—Skin of rat; normal.
Fig. 2.—Skin of rat; 0·0123 mg. radium for seventy-four days.
Fig. 3.—Skin of rat; 0·0123 mg. radium for seventy-four days.
Fig. 4.—Skin of rat; 0·019 mg. radium for fifty-five days.
Fig. 5.—Skin of rat; 0·0168 mg. radium for sixty-nine days.
Fig. 6.—Skin of rat; 0·037 mg. radium for thirty-two days.
Fig. 7.—Skin of rat; 0·14 mg. radium for twelve days.
Fig. 8.—Skin of rat; 0·019 mg. radium for ninety days.
Fig. 9.—Skin of rat; 0·035 mg. radium for fifty-two days.
Fig. 10.—Skin of rat; 0·0122 mg. radium for one hundred and sixty-two days.
Fig. 11.—Skin of rat; 0·062 mg. radium for thirty-five days.
Fig. 12.—Skin of rat; 0·062 mg. radium for thirty-five days.
Fig. 13.—Skin of rat; 0·036 mg. radium for sixty-one days.
Fig. 14.—Skin of rat; 0·092 mg. radium for twenty-nine days.
Fig. 15.—Skin of rat; 0·0346 mg. radium for ninety-one days.
Fig. 16.—Skin of rat; 0·062 mg. radium for fifty-four days.
Fig. 17.—Skin of rat; 0·12 mg. radium for twenty-nine days.
Fig. 18.—Skin of rat; 0·146 mg. radium for twenty-nine days.
Fig. 19.—Skin of rat; 0·12 mg. radium for forty-six days.
Fig. 20.—Skin of rat; 0·15 mg. radium for forty-four days.
Fig. 21.—Skin of rat; 0·14 mg. radium for fifty-four days.
Fig. 22.—Skin of rat; 0·109 mg. radium for one hundred and twenty-nine days.
Fig 23.—Gall-bladder of rabbit; normal, low power,
Fig. 24.—Gall-bladder of rabbit; normal, high power.
Fig. 25.—Gall bladder of rabbit, control 1; low power.
Fig. 26.—Gall bladder of rabbit, control 1; high power.
Fig. 27.—Gall-bladder of rabbit. control 2; low power.
Fig. 28.—Gall bladder of rabbit, control 2; high power.
Fig. 29.—Gall-bladder of rabbit, control 3; low power.
Fig. 30.—Gall-bladder of rabbit, control 3; high power.
Fig. 31.—Gall-bladder of rabbit A; radium, low power.
Fig. 32.—Gall-bladder of rabbit A; radium, high power.
Fig. 33.—Gall-bladder of rabbit A; radium, metastasis, low power.
Fig. 34.—Gall-bladder of rabbit A; radium, metastasis, high power.
Fig. 35.—Gall-bladder of rabbit B; radium, low power.
Fig. 36.—Gall-bladder of rabbit B; radium, high power.
Fig. 37.—Gall-bladder of rabbit C; radium, low power.
Fig. 38.—Gall-bladder of rabbit C; radium, high power.
Fig. 39.—Gall-bladder of rabbit D; radium, low power.
Fig. 40.—Gall-bladder of rabbit D; radium, high power.
Fig. 41.—Gall-bladder of rabbit E; radium, low power.
Fig. 42.—Gall bladder of rabbit E; radium, high power.
Fig. 43.—Gall-bladder of rabbit F; radium, low power.
Fig. 44.—Gall-bladder of rabbit F; radium, high power.

Professor S. G. SHATTOCK: Whilst one must fully recognize the value of the author's results, and the prospect they open up of further developments in experimentation upon the ætiology of carcinoma, it does not seem to me that the lesions can safely be regarded as more than "pre-cancerous." The down-growth of the epidermis in the rat's skin in no case transgresses the limits of the corium; and on the removal of the radium the changes, instead of progressing, disappear. In regard to the proliferative changes set up in the mucosa of the gall-bladder by the action of radium introduced into gall-stones, those seen in the bile-ducts in coccidiosis are quite as pronounced. For the production of carcinoma there is, I think, a second factor which still needs discovery. The author's view that this consists in a lessened resistance requires scientific demonstration; nor is it logically the only other possibility, for there may be a second *extraneous* factor, such as the access of an ultra-microscopic virus. Amongst the author's results there was one in which a metastasis had occurred in the liver; but here some such factor might have come into play, and the inflammatory proliferative process have been succeeded by the growth of a proper carcinoma.

Section of Pathology.

President — Dr. Bulloch, F.R.S.

Tumours arising from Endothelium.[1]

By E. H. Kettle, M.D.

(From the Pathological Department, St. Mary's Hospital.)

I have long been interested in the possibilities of tumour formation from endothelium, but I have invariably found the recognition of these neoplasms a difficult matter. There is, of course, nothing very characteristic about the endothelial cell apart from its property of forming the lining of a vessel, and I know of no definite standards by which it is possible to distinguish the endotheliomata from other neoplasms. But I believe that some of the accepted points in the diagnosis are the following: An undifferentiated polymorphic-celled type of growth; a whorled arrangement of the cells with the formation of elongated tubules and narrow trabeculæ; the presence of tumour giant cells; the close association of the growth with blood-vessels; and the formation of lumina or channels which may contain blood. Some of these criteria might equally be applied to the carcinomata; others appear to me to have been accepted with very little critical examination.

Some months ago one of the tumours which I propose to describe came under my observation, and led me to work through my material systematically in the hope of gaining clearer ideas on the subject. The work is far from complete, but I have been able to examine two cases in detail.

---

[1] At a meeting of the Section, held April 16, 1918.

The first case is a malignant endothelioma occurring in a woman aged 44. From childhood a condition of elephantiasis of the right foot and leg had been present, but had caused little inconvenience till 1914, when the limb began to ache continuously, the pain becoming much worse after walking. About this time a bluish-red discoloration of the skin of the leg was noticed, and there also occurred severe attacks of sharp shooting pain. In 1915 the patient came to St. Mary's Hospital and Mr. Clayton-Greene incised the leg in several places, inserting silk drains. The wounds healed satisfactorily and the limb was massaged for some time, a certain amount of relief following the treatment, but by October, 1916, the condition was as bad as ever. The patient returned to hospital, and the leg was amputated above the

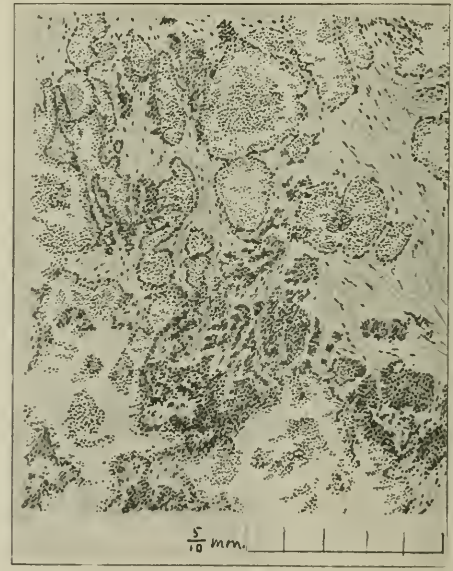


Fig. 1.

Case I. Low power view of tumour, showing large spaces containing fluid blood, with areas of solid growth.

knee. A diagnosis of diffuse cavernous angioma was made as the result of microscopic examination. The patient left hospital and for six months had complete relief from symptoms, but by August, 1917, the stump had become hard and discoloured, and severe pain was continuous. With the hope of relieving the pain, and at the patient's own request, Mr. Clayton-Greene amputated at the hip-joint. It was a difficult operation, for the growth extended up to the groin, and the external iliac artery had to be ligatured through the peritoneum, but the patient left the hospital within a fortnight and is perfectly well and free from symptoms up to the present.

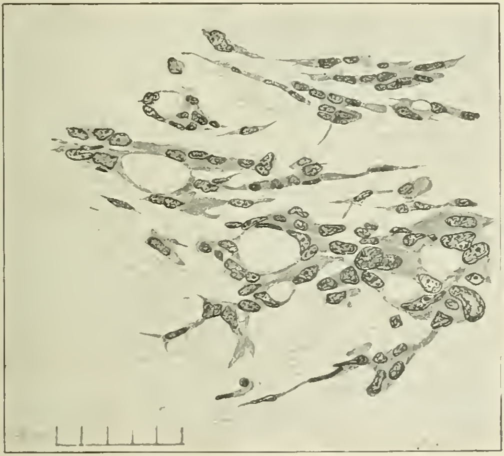


FIG. 2.

Case I. Vasoformative type of cell. The tumour cells are growing as branching, vacuolated syncytia.

The specimen was sent to me for examination. The scar of the previous amputation was quite healed, but the stump, though not enlarged, was of a dense craggy hardness, a condition which extended upwards on the anterior and inner aspects of the thigh to the groin. There was much discoloration of the skin, which was bluish-black over the stump itself, reddish over the rest of the limb; and over the stump and anterior surface of the thigh it presented a diffuse finely nodular condition. On incision, the stump was found to be infiltrated with a hard, intensely hæmorrhagic growth, involving the skin, and extending irregularly in the subcutaneous fat upwards to the groin. The posterior and outer aspects of the thigh were much less involved and there appeared to be no invasion of the muscle. The femoral glands were enlarged and filled with growth.

The histological structure of the tumour is at first sight somewhat complicated. Under a low magnification the most striking feature is the occurrence of large irregular spaces, which contain fluid blood, and in places occupy almost the whole of the microscopic field. Sometimes they possess a thick lining of spheroidal cells, but more often the lining is reduced to a single or double layer, and it may be absent altogether. Associated with these vascular elements are areas of more solid growth, consisting of cells which are grouped loosely or compactly in large or small masses without any intercellular substance. No typical form exists, but the cells vary enormously in size and shape, and though perhaps the majority are spheroidal in shape, flattened squamous and long columnar forms also occur. The nuclei are also extremely variable in shape and structure, and occasionally multi-

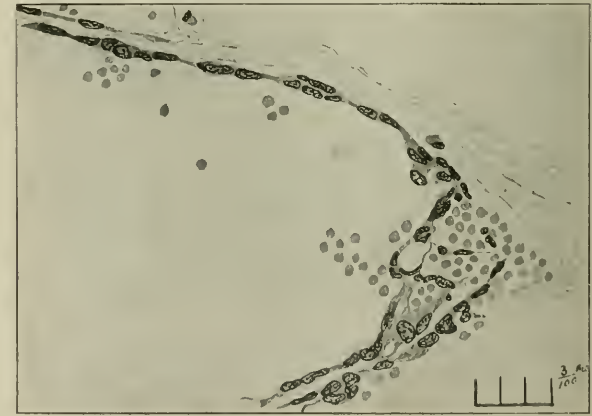


Fig. 3.

Case I. Tumour cells forming an endothelium of a blood space.

nucleated cells can be seen. Dividing cells are very rare. In the greater part of the growth, even in the smallest outlying nodules, there is an abundant fibrous stroma.

In places, however, there are indications as to the true nature of the growth. At the growing margin branching syncytial forms occur which bear a striking resemblance to vasoformative cells, and occasionally, when growing in looser tissue, these syncytia may be drawn out as a flattened lining to a blood-containing space, that is to say, they form an endothelium. But however variable the tumour cells may be in most respects, one very constant feature is the occurrence in the cytoplasm of vacuoles which do not contain fat but are apparently the result of a simple degeneration. These vacuoles are of great importance, for it is by their confluence that the large characteristic spaces are formed.

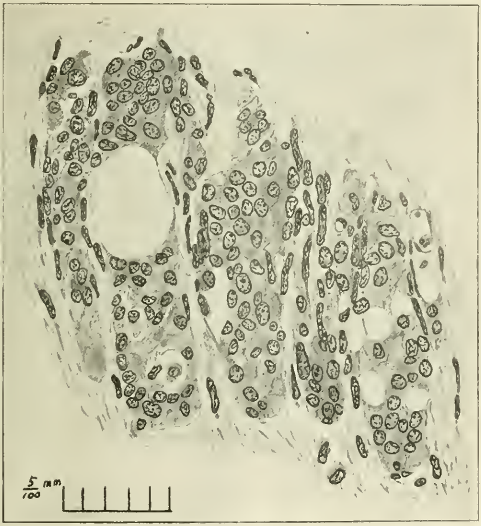


Fig. 4.

Case I. To show early vacuolation of tumour cells.

In fig. 4 small groups of tumour cells show vacuoles in various stages of development. Early ones can be seen to the right of the figure, while on the left is a large one which is bounded laterally by the connective tissue stroma, the cells of which are increasing in number and size. Fig. 5 shows a more advanced degree of degeneration affecting larger groups of cells and resulting in the formation of big spaces, in which the remains of cells can still be seen. The lining of part of the wall of such a space is seen in fig. 6 under a higher magnification—the cells are several layers thick and show advanced vacuolation.

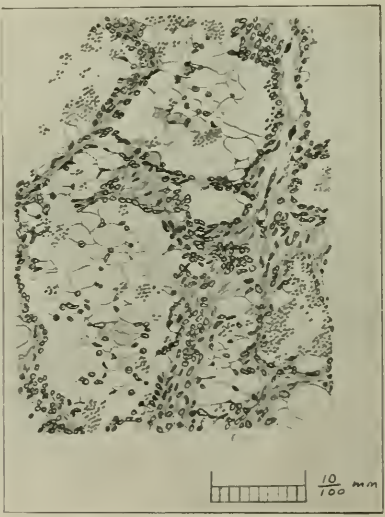


Fig. 5.

Case I. A more advanced degree of vacuolation of cells with the formation of large spaces into which blood has oozed.

I have laid stress on this vacuolation of the tumour cells, for not only does it give us a reasonable explanation as to how lumina may be formed in endotheliomata, but it also gives us a means of recognizing the neoplastic endothelial cell. It is, of course, the usual process by which new vessels are formed, whether they are derived from the budding of the endothelium of pre-existing capillaries with subsequent canalization of the outgrowth, or whether they arise by the growth and fusion of the vasoformative cells of the mesoblast. It is also common in many morbid conditions. It occurs in the vessels in the neighbourhood of inflammatory lesions; it has been described by Takahashi[1] in vessels containing malignant emboli; and it may often be seen in the vessels of the stroma of malignant new growths.

With regard to the blood-containing spaces, it must be recognized that in the malignant endotheliomata they represent merely an attempt on the part of the tumour cells to perform their normal function. There is only very rarely any orderly growth or grouping of the cells to form lumina, but the spaces result from a degenerative process which has its counterpart in the physiology of the normal angioblast, though it is quite uncontrolled in the malignant cell. This is clearly seen in the preparations, for in many places the lining cells of the spaces have degenerated, liberating the contained blood, which has infiltrated the surrounding connective tissue.

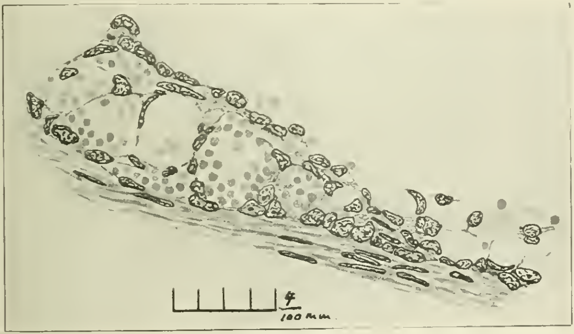


FIG. 6.

Case I. Part of the wall of a vascular space under a high magnification. It is lined by cells showing a high degree of vacuolation, and many of the vacuoles contain blood.

Finally, it remains to be shown how the tumour spaces come to contain blood. I have examined many blocks from the main growth and have cut several of the smallest nodules in complete series, but

---

[1] "An Experimental Study of Metastases," *Journ. Path. and Bact.*, 1915, xx, pp. 9-13.

I have never been able to demonstrate any physiological connexion between the blood spaces of the tumour and the vessels of the host. What happens is this. Small capillaries of the stroma rupture as the result of infiltration of their walls by the tumour, and blood is effused into the surrounding tissue, forming, as it were, a cistern from which it oozes into the vacuoles already prepared in the tumour cells. There is no true circulation of blood in the growth, but the condition is comparable with that seen in the early weeks of the development of the ovum, where, as the result of rupture of the maternal capillaries, blood is extravasated into the chorio-decidual space and so reaches the vacuolated elements of the trophosphere.

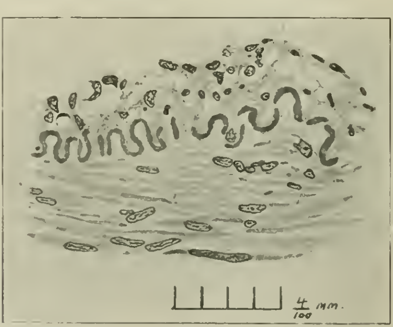


Fig. 7.

Part of the wall of an artery from the stroma of a malignant new growth, a squamous-celled carcinoma. It shows proliferation and vacuolation of the endothelial cells. Compare with figs. 5 and 6.

I have called this tumour a malignant endothelioma, and no other diagnosis seems possible. Its general structure, its infiltrative and destructive growth, and the formation of metastases in lymphatic glands establish its malignancy as clearly as one can hope to do with human material. The proof of its endothelial origin is more difficult, since the diagnostic features of endotheliomata are by no means clearly defined. But it reproduces the structure of the hyperplastic or developing endothelial cell in so many respects that I cannot doubt its origin from this tissue, and for me, at least, it presents valuable indications of the properties one might expect an endothelioma to possess.

The second tumour is quite frankly derived from the endothelium of blood capillaries. It occurred as a rounded swelling, the size of half a walnut, on the left side of the back of a female child aged 4 months. It was attached to the outer border of the erector spinæ, and the skin was freely movable over it.

The clinical history of this case is brief and unfortunate. The tumour had been noticed for six weeks when the child was admitted to hospital for operation. The operation took place the day after admission, but the first incision had scarcely been made when the child died, presumably from anæsthetic poisoning. In these circumstances the case passed under the jurisdiction of the Coroner, and I am unable to furnish any report of the post-mortem findings, but the tumour, a firm fleshy mass, was sent to me for examination, and at the time I described it as an angiosarcoma ; recently, however, I have altered my opinion.

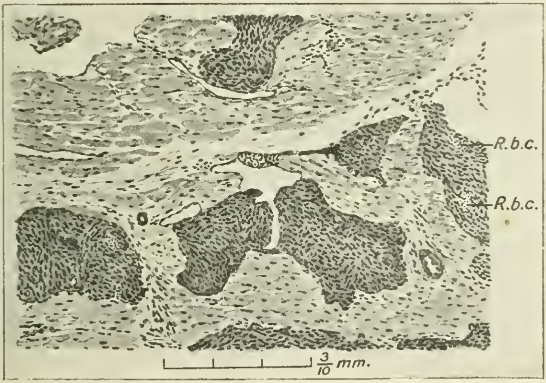


FIG. 8.

Case II. Low power drawing showing solid alveoli of tumour cells which, here and there, form capillary systems containing fluid blood ; the alveoli are growing freely among the muscle bundles. Note the large sinuses at the margins of the alveoli.

Histologically, the tumour resembles in many respects the ordinary hæmangioma hyperplasticum. It is composed of rather large fusiform cells, having a scanty reticular cytoplasm and a big oval nucleus. These cells are grouped together in irregular alveoli, but a delicate hyaline intercellular material can often be distinguished between them. There is free infiltration in the muscular tissue of the part, and isolated muscle fibres are sometimes entirely surrounded by tumour cells.

The cytoplasm of the cells is loose and reticular, and a great number of them are definitely vacuolated. As in the previous tumour, these vacuoles increase in size until they occupy practically the whole of the cell, the nucleus being compressed at the side. Finally, the walls between adjacent vacuolated cells break down, and channels are formed which ultimately come to contain blood. But in this tumour the process is never so irregular as in the first case. Quite definite capillaries are formed with a regular endothelial lining—only rarely do the cell walls give way so as to give rise to larger spaces.

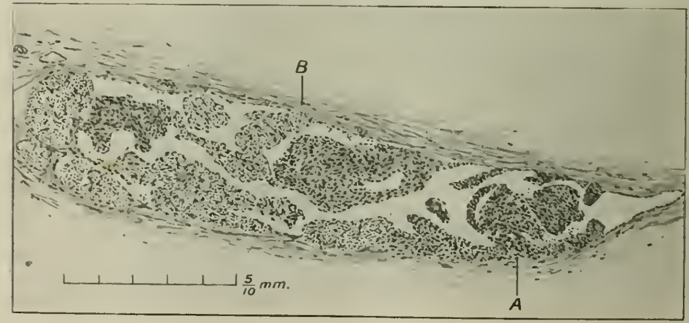


FIG. 9.

Case II. A low power drawing of a large sinus, the lumen of which is filled with papillary ingrowths of the lining endothelium. Some of these papillomata are solid, though their cells show vacuoles in various stages of formation, *A*; others consist of coiled capillaries, *B*.

Although the growth is for the most part quite vascular, areas are occasionally met with where the tumour cells are longer and more slender, and are arranged in bundles, rather in the fashion of a spindle-celled sarcoma. But this is not common, and at the periphery especially the tendency is to a looser texture with the formation of larger numbers of capillaries. Occasionally there occur large dilated sinuses which are filled with papillary ingrowths of the lining endothelium. These papillomata are extremely vascular, and are formed entirely by the proliferation of the endothelium lining the sinuses. In this respect this tumour differs from the angioma described by Borrmann[1] some years ago as an example of an innocent tumour which formed metastases. In Borrmann's case papillomata also occurred, but they always contained a connective tissue core, and he lays stress on the fibro-endothelial nature of the growth.

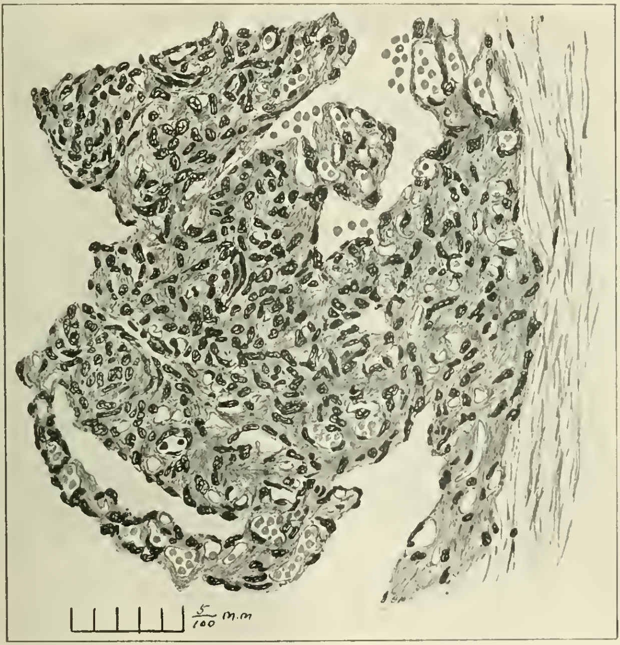


FIG. 10.

Case II. High power view of area *A* in fig. 9.

---

[1] "Metastasenbildung bei histologisch gutartigen Geschwülsten," *Ziegler's Beiträge zur path. Anat.*, 1907, xl, pp. 372-392.

Closely associated with the cellular elements, usually in intimate contact with the margins of the alveoli, are numerous large capillaries or sinuses, lined by a single regular layer of endothelium. They do not belong to the stroma, but are an actual and most important part of the tumour, which, in fact, is derived from their lining endothelium. These channels ramify through the muscles and connective tissue as narrow clefts, which in serial preparations can be traced through thirty or forty sections or more. They widen out considerably when in contact with the alveoli, and at first I thought that their peculiar structure might be explained on the assumption that they were dragged out in this way by the tension on their walls of the growing cells in the neighbourhood. This, however, is not the case. In every channel which I have followed through in the series the dilatation completely encloses the cell

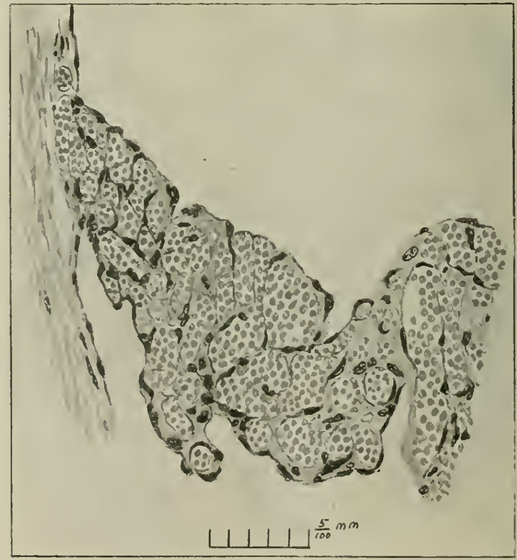


Fig. 11.

Case 11. High power view of area *B* in fig. 9.

masses, which are simply localized proliferations of the lining endothelium. Sometimes neighbouring groups of cells fuse together, and elsewhere the cellular proliferation may be so extreme that the true relationship of cells to channels may be obscured, but whenever I have been able to follow an alveolus from beginning to end I have found it to arise from proliferation within the lumen of a channel of the lining endothelium. There is never any growth away from the vessel, it is always into the lumen.

These vessels do not necessarily end with the alveoli. They form an extremely complex system, and I have never been able to trace their termination in this direction; but by good luck I have been able to demonstrate the other extremity of one of them. It communicates directly with what is apparently a perfectly normal vein. This is shown in fig. 12, where a long-drawn-out channel communicates with a vein on the one hand and a mass of tumour cells on the other. The next figures illustrate these communications under higher magnifications. In fig. 13 the junction between the channel and the vein is apparently

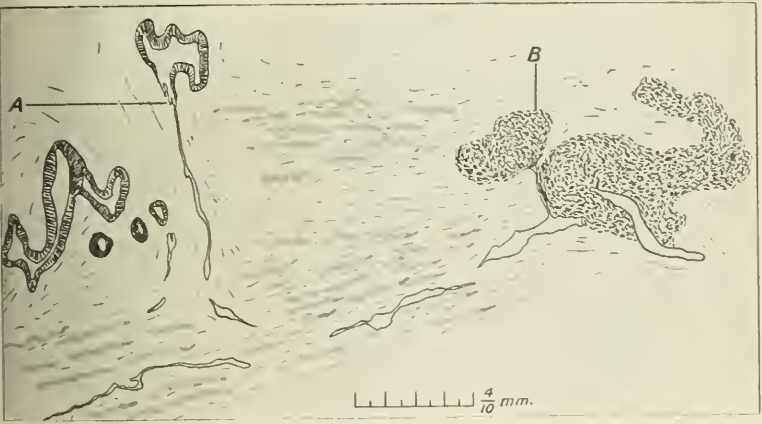


Fig. 12.

Case II. Low power drawing showing a complex capillary system, one end of which communicates with a normal vein, *A*, while the other is intimately associated with a nodule of growth, *B*.

normal, but just below it two tongue-like processes of endothelium project into the lumen of the vessel.

This tumour seems to me quite unusual. Most pathologists would regard it as a true neoplasm, and the clinical pathologist would be fully justified in calling it malignant. Yet there is a physiological connexion between it and the normal tissues, and this is surely incom-

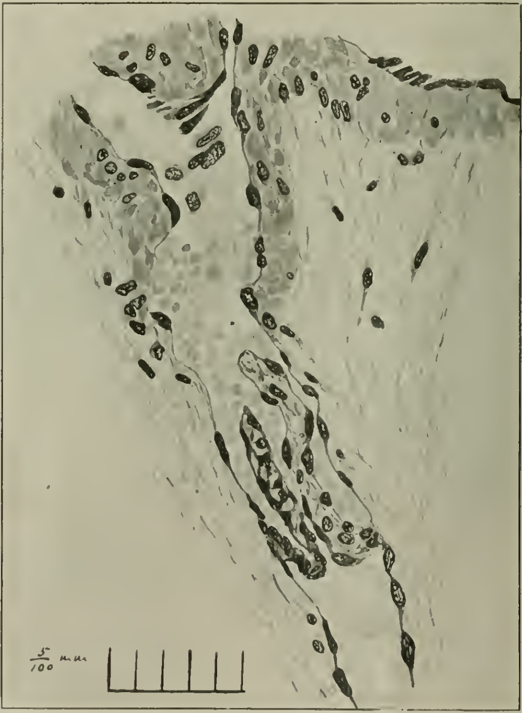


Fig. 13.

Case II. High power view of area A in fig. 12, showing connexion between the vein and the capillary system. It is normal in every respect, but two tongue-like proliferations of the lining endothelium project into the lumen of the first part of the capillary.

patible with all modern views. Either we must regard this tumour as an example of gradual neoplastic transformation of normal tissues, or as a blastomatoid condition, and not a true neoplasm. I am inclined to favour the latter view.

But whatever else it is, it is certainly an overgrowth of endothelium, and I submit that it is only by the careful study of such conditions that one can arrive at satisfactory conclusions as to the true nature of the great mass of tumours which are at present grouped together as endotheliomata.

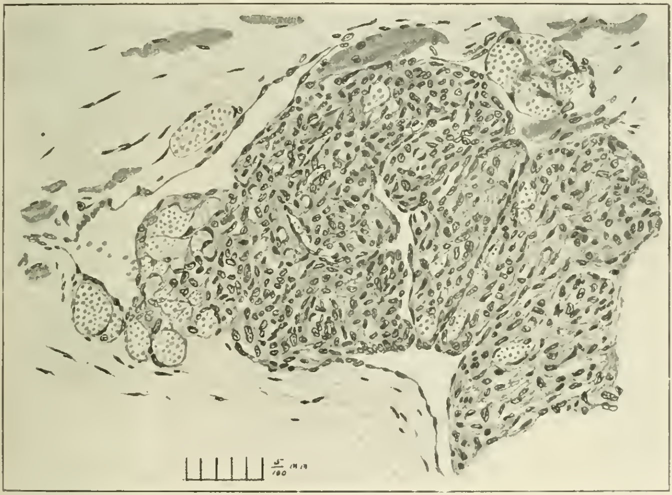


Fig. 14.

Case II. Area *B* in fig. 12 under a higher magnification. Serial sections show that, at this point, the vessel is dilated, its lumen being filled with ingrowth of its lining endothelium. Note the vacuolation of the proliferating cells and the formation of delicate capillaries.

Dr. F. Parkes Weber: I think that the tumour arose from some congenital focus of undifferentiated tissue, not only in the second patient, but likewise in the first patient, whose leg had been obviously abnormal from birth. The tumour, moreover, in both cases, to a certain extent, resembles an atypical form of the chorionepithelioma group. In the first case the cellular clumps might be possibly taken as representing the cells of the Langhans layer of the normal chorionic epithelium, and the slender syncytial lining of part of one of the blood-sinuses might represent the syncytial layer of the normal chorionic epithelium. In the second case the cellular ingrowths from the walls of the blood-sinuses might possibly be taken as also representing the Langhans layer of chorionic epithelium. Chorionepithelioma, when it occurs (as in males and virgins) altogether unconnected with pregnancy, is now generally supposed to be derived from chorionic elements in an embryoma or teratoma. But might not analogous or atypical tumours of the same group be derived from a congenital focus of altogether undifferentiated tissue? Such tumours have doubtless been classified under such headings as endothelioma, angiosarcoma, and angioplastic sarcoma.

Section of Pathology.

President — Dr. BULLOCH, F.R.S.

Osteomalacia Sclerotica — "Boomerang" Bones, Corkscrew Bones — the so-called "Boomerang" Leg; Sclerosing Panosteitis of the Long Bones preceded by Softening and Plasticity, and resulting in Considerable Deformity.

By J. B. CHRISTOPHERSON, M.D.

(Director of Civil Hospitals, Khartoum and Omdurman.)

INTRODUCTORY.

THE cases which I am about to record are of natives of the Sudan, but that the disease has occurred in Europe is evident from the fact that in "Anomalies and Curiosities of Medicine," 1901, is a representation of Orloff, "the transparent man," "showing curious deformity of the long bones and atrophy of the extremities." The illustration is undoubtedly that of a man suffering from "boomerang bones."[1] Apart from the above the disease has only been described from Australia.

The first to recognize this noteworthy deformity was Ernest Black, who, under the name "boomerang leg," described it in a brief note which he gave verbally to the authors.[2] Ernest Black was President, Central Board of Health, Director of State Labour, and Principal Medical Officer of Western Australia. He reported the disease as occurring among the aboriginal natives of the North of Western

---

[1] Gould and Pyle, fig. 216, p. 604.

[2] Castellani and Chalmers, "Manual of Tropical Medicine," 2nd ed., 1913, p. 1447.

Australia, and as existing in the Northern Territory of the Commonwealth, and in Torres Straits Islands.

In October, 1915, A. Breinl and H. Priestley describe "boomerang" leg.[1] They also had met it amongst Australian aboriginals of North Queensland, and amongst natives of the Western parts of British New Guinea. Breinl mentions no bones affected other than the tibiæ. "The fibula," he says, "did not show any change beyond a corresponding forward curve." Ernest Black also limits the disease to the legs. Breinl and Priestley reproduce good photographs of the X-ray appearance, and of a dried specimen of the tibia.

The first case described in this paper comes from the Sudan, and it is therefore evident that the deformity is present in Africa. The disease appears to be a definite entity, though perhaps not well named. It was, in the present instance, well marked in all the long bones of both upper and lower extremities, tibiæ, fibulæ, femora, humeri, radii and ulnæ, but it is more marked in the legs than in the arms, more marked in the thighs than in the upper arms.

In consideration of the fact that all the long bones are more or less affected, the name "boomerang" bones seems more appropriate than "boomerang" leg, as the latter implies that the disease is limited to the lower extremities, which is not the case, but in view of the fact that the disease may not present the "boomerang" deformity at all, both names are objectionable. I therefore suggest the name "osteomalacia sclerotica."

History of the Present Case.

Hassan el Haj Arabi, aged 35, an Arab with no apparent Negroid blood in him, was born at El Obeid, in Kordofan Province of the Sudan. His mother and father are both dead. He states that his limbs were normal at birth. His father was a great age when he was born—so old, he says, that he could not see. He says that his father was 150 years old when he died. His mother was also old when he was born, but he does not know her age.[2] He has three brothers and two sisters. All are older than he, and all have good health and sound limbs. All are by the same father and mother. His sisters are in Omdurman—

---

[1] *Journ. Trop. Med. and Hyg.*, October, 1915, p. 217.

[2] *Note.*—We may fairly assume that the patient was born of old parents, although we are not obliged to believe that his father was 150 years old.

they are tall, have straight limbs, are married, and have children who are all sound and normal.

When about 7 years old[1] he had small-pox, measles and chicken-pox, one after the other. Whilst he had small-pox he had "fever and pain in his bones." On recovering from the small-pox he found he could not walk, and his limbs became bent, gradually getting worse, until they reached the condition they are in now (*see* figs. 3, 4). No other member of his family had small-pox at the same time as himself. He was nursed by his mother, who had had small-pox.

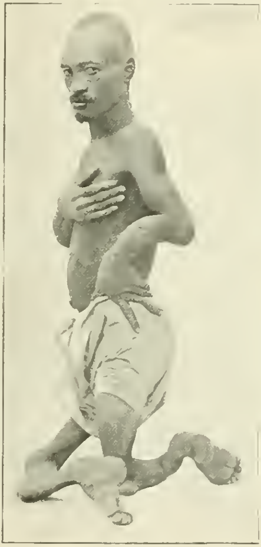


FIG. 1.

Hassan el Haj Arabi, aged 35. (Osteomalacia sclerotica.) Standing up to his full height.

He states that up to the time of his small-pox his limbs were quite normal, that he could run about like other boys. He says there are people in Omdurman who knew him when he was sound of limb. He attributes the trouble to the small-pox. He was breast-fed by his mother. He has had neither syphilis nor gonorrhœa. He is married, but he has no children.

---

[1] Dates are uncertain things in the Sudan.

The man's legs are so shortened that on standing up his hands, hanging at his side, touch the ground. Both the head and trunk appear natural, and no deformity nor disease can be made out in the head or trunk bones. All the internal organs are natural to ordinary clinical examination. The intellect is alert and normal—the special senses also. Hair and teeth are natural.

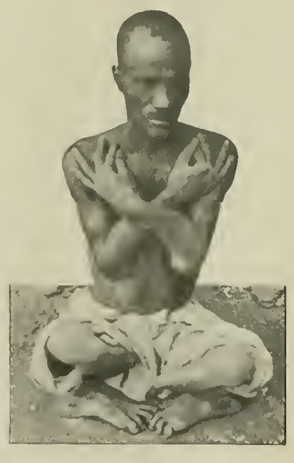


FIG. 2.

Sitting. Throwing his weight forwards a little he walks.

Judging from appearances, the lower extremities under the weight of the body might have collapsed, like a concertina, and look somewhat like dilapidated corkscrews. When this collapse took place it might appear as if the arms in their efforts to check the further progress of the trunk towards the ground have become bent, though not so much as the legs. This picture is fanciful, no doubt, but it is what actually occurred, though, of course, not suddenly—it may have taken weeks to complete, or months or even years.

When the man walks (*see* fig. 1) the movement may be described as a shuffle and, at the same time, a waddle. He takes very small steps, having little more than the length of the crumpled up tibiæ in place of the full length of leg for his stride. He walks like a penguin. He walks on the soles of his feet, which are inverted, squatting almost in a sitting position (fig. 2).

Livelihood.—He has a little land and one or two slaves to work for him—he need use neither hands nor head in the Sudan to make his living, but he would be perfectly able to make a living with head and hands if it were necessary.

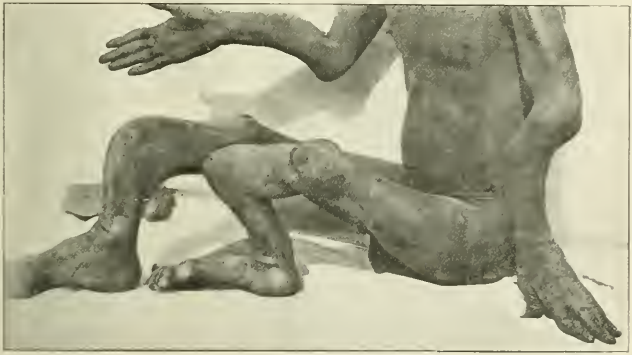


Fig. 3.

Upper and lower extremities.

His usual mode of progress is on a small donkey, on whose back he scrambles with remarkable agility without assistance, arranging his legs on the neck. With no bridle nor reins he guides it by means of a small stick.

The disease appears to be limited to the long bones of the two extremities ; the shafts in particular are affected, the articular ends appear to be very little involved—perhaps the joints of the affected bones are a little thicker than natural but this is all. The small bones of hands and feet, and the bones of the trunk and head appear quite natural.

Morbid Anatomy.—If the bones were examined it would be found that they are bent at an angle and also on the flat, and that they were also twisted and curved longitudinally, reminding the observer of gnarled and distorted branches of a tree. There would not appear to be any actual lengthening or shortening of the affected bones. The most striking anatomical change in the present case is a flattening of the bones. If a transverse section were cut it would appear like the section of a two-edged sword. The bones, therefore, are like boomerangs, not only on account of the angle but also on account of the flattening. In the longitudinal section of the dried specimen cut by Breinl and Priestley the changes in the interior of the bone seem to be as follows: The medullary canal is completely obliterated—the place of the cancellous tissue is occupied by sclerosed bone, the dense compact layer of bone normally encasing the shaft is thickened in a manner suggesting buttresses to support the once weak, collapsing structure. On the concavity of the bend the buttress is thickest at the angle, on the convexity the compact layer is thinnest at the angle, and becomes thicker towards the extremities. The surface of the bone is smooth and dense, and the natural ridges marking the attachment of the muscles are exaggerated. With regard to these changes (figs. 2, 3, and 6), two forces have acted to bring them about. In the first place, the bending of the bones is undoubtedly due to the weight of the body,

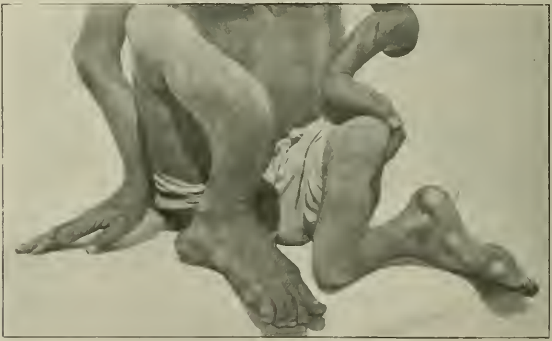


Fig. 4.

Upper and lower extremities.

and the twisting to the posture of the limbs, and the flattening, which cannot possibly be due to either the weight of the body or the posture of the limbs, is probably due to muscular action—compression of the malleable bones between the muscles.

One may conjecture, during the attack of small-pox, an inflammatory condition taking place causing "fever and pain in the bones," the acute stage leading to a softening of the bones which bent when used, and when the inflammation became chronic, giving place to sclerosis of the bone, the bones becoming eventually harder and stronger than natural, consolidated however in their unnatural bent and twisted state.[1]

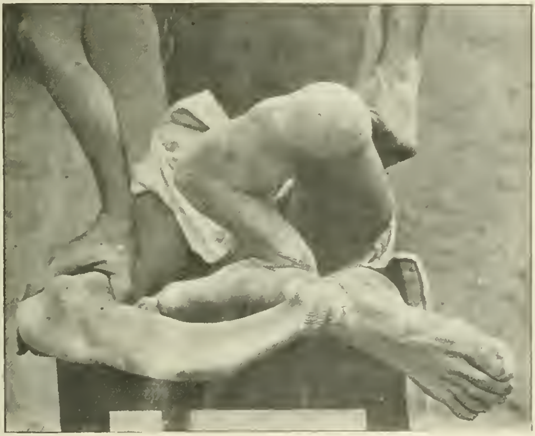


FIG. 5.

Showing twisting and bending of legs and thigh. Hands and feet natural.

In discussing the nature of the disease, two questions arise :—

(1) Are we dealing with a specific disease ? And, if so, what is its cause ? Or,

(2) Is the condition the manifestation of a general disease like rickets, mollities ossium or syphilis ?

---

[1] I cannot help thinking that the disease started some time after birth, perhaps during the walking period. But another theory that strikes one very forcibly is that it is a pre-natal condition. One can imagine him in the uterus—he folds up so well (*see* photograph, fig. 2). *See* also Case II.

It may be useless and unprofitable to speculate as to the causal factor of "boomerang" bone. There appears to be no evidence that "boomerang" bone is due to any cause associated with the ductless glands.

We may say at the same time that there is no evidence in support of any relationship between "boomerang" bones and syphilis or tuberculosis. Achondroplasia may also be dismissed, for in achondroplasia there is definite shortening of the shaft of the bone, and the bending of achondroplasia is simply the exaggeration of the natural curves.

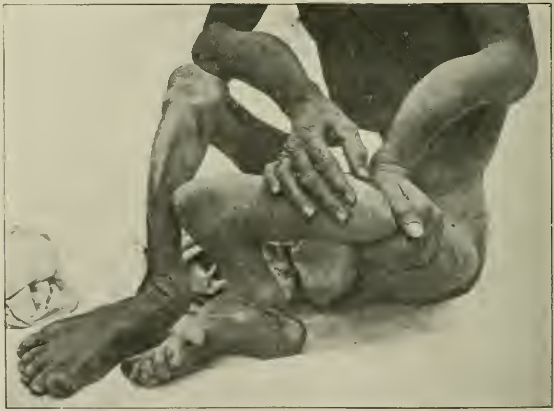


Fig. 6.

Hands and feet unaffected. Long bones all involved.

The two outstanding characters of the condition, the bending and twisting, and the softening of the bones would suggest two diseases —mollities ossium and rickets—the former being suggested by the softening and the latter by the sclerosis of the bones which follows the softening. It is neither the one nor the other.

"Boomerang" bone is not *mollities ossium* (osteomalacia), for mollities ossium commences in adult age, occurs in females, and attacks the spine and pelvis early, which are unaffected in "boomerang" bone; added to this mollities ossium does not go on to sclerosis, which is manifestly a characteristic of "boomerang" bone. Finally a characteristic feature of mollities ossium is absent in "boomerang" bone—namely, spontaneous fracture. It would be a difficult matter to fracture a "boomerang" bone.

Rickets is not so easy to exclude as syphilis, tubercle and mollities ossium, mainly because the ætiology of rickets itself—the commonest of all children's diseases in England—is a matter of uncertainty. Is rickets due to deficiency of fat or proteid in food? Is it due to food at all or to some delinquency of the ductless glands? These theories are all at this present time matters for debate. Rickets is as rare in the Sudan as it is said to be in Japan, possibly for the reason the native children are seldom artificially fed—on the other hand they are suckled up to the age of 2 years or even older. Apart from the fact that rickets is rare or non-existent in the Sudan, anatomically "boomerang" bone is not rickets. The epiphyses are not affected in the marked way they are in rickets. The entire body in rickets appears to be affected, whereas in "boomerang" bones the shafts only of the long bones suffer; rickety curves of the long bones are exaggerations of the natural curves of the bones; this is not so in "boomerang" bones.

In the present case there are no characteristic signs of rickets about the body. But it is easier to say what "boomerang" bone is not, than what it is. There is, however, one striking fact common to all three diseases—mollities ossium, rickets, and "boomerang" bone—in none is the ætiology really known.

In the case under discussion we may ask what are the facts which seem to throw any light on the ætiology of "boomerang" bones? A youngest son of aged parents, having brothers and sisters quite normal and healthy, is born healthy, and is breast-fed. If his story is true he continues healthy up to the age of 7, when he has learnt to walk and run about like other boys. Then he has small-pox, measles, and chicken-pox consecutively. When the small-pox leaves him he finds that he cannot walk, and his limbs become bent and gradually assume the condition seen in fig. 6. He describes his plight as "fever and pains in the bones." In time the "fever" and the "pains" leave the bones and they become consolidated in the new position and the deformity results.

In conclusion one or two points which seem to emerge from this paper may be summed up as follows:—

(1) The disease which we may call "boomerang" bones, though I think there is evidence to show that "boomerang" deformity does not always result, appears to be a definite entity.

(2) It is not confined to the Australian Continent, but is found in Africa and Europe.

(3) It is not limited to the lower extremities but, on the contrary, affects all long bones without exception (figs. 3, 4).

(4) The deformity is more marked in the lower extremities, but this is due to the fact that the bones are called on to support more weight than those of the arm, and in their soft state the leg bones become more deformed.

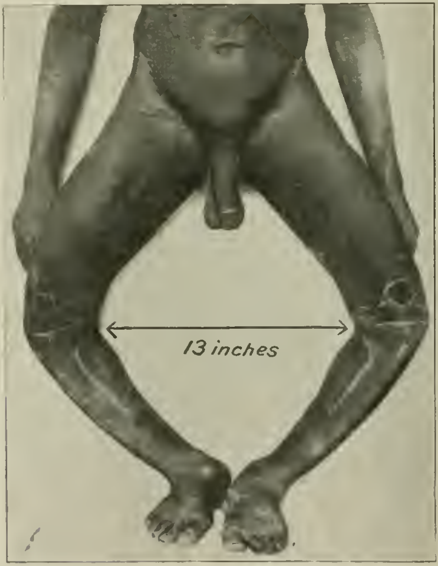


FIG. 7.

Genu varum due to angular curve inwards of tibiæ and relaxation of external ligaments of knee.

(5) The bone affected is not only bent at an angle like a boomerang, it is generally also flattened like a boomerang or a two-edged sword, and it is not only bent and flattened, but it is twisted (fig. 5).

The bending is due to the weight of the body acting on softened bones. The flattening is due to the compression of the surrounding muscles acting on soft malleable bones. The twisting results from the weight of the limb.

During the period I was engaged investigating the case just described, an Arab boy, aged about 22, came to the Khartoum Hospital. He was suffering from an extreme degree of genu varum. He had not the least suspicion of rickets about him. On examination the knee and other joints were normal; and I found that the genu varum was simply to compensate for an angular bend inwards of the tibiæ below the heads of the bones (fig. 7). The boy, though small (standing 44½ in., his sitting height being 37½ in.), in fact a dwarf, was very well proportioned, quite normal, and well formed except for his extreme bow legs (genu varum). All the bones and joints in the body seemed normal except the tibiæ and knee-joints (X-ray and clinical examination). When he sat

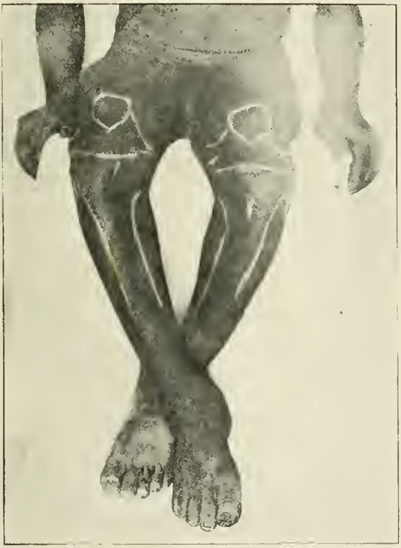


Fig. 8.

Genu varum. Sitting: knees and thighs come quite together.

down (fig. 8) the thighs came naturally together—the patellæ looking directly forwards, and it can be seen that the cause of the deformity lies with the upper end of the tibiæ. The knee-joints are somewhat flail-like, the external ligaments of the joints relaxed, so that he can correct the deformity to a certain extent by straightening his legs, whilst standing, with his leg muscles. There is 13 in. separation between the two condyles of the femur while standing. There is a well-marked angular inward bend just below the heads of the tibiæ—making an angle of 45° with the perpendicular; and all the other abnormalities of position of the joints (hip, knee, ankle), are to compensate for this in order to enable him to walk with his feet normally placed. He was so born, he states, and his disease commencing *in utero*, the deformity was probably due to position; but undoubtedly the tibiæ must have been more plastic than normal, and were probably affected with the same disease as Case I. His mother is alive and normal; he has two brothers and one sister, all of normal height and size with no deformity. I repeat that there is not the smallest evidence of rickets elsewhere in the body. On standing his hands come to his knees. He is a messenger by occupation, in Government employ.

There appears to be a definite disease of long bones not associated with rickets nor with osteomalacia, but which has definite characteristics of its own and, at the same time, has characters at periods of its development of both osteomalacia and rickets. It is not hereditary, and if both the cases I have reported are the same disease—which I provisionally name "osteomalacia sclerotica"—it commences either *in utero* as in Case II, or in infant life as in Case I. The first stage would correspond to the mollities ossium type—a softening inflammatory panosteitis, allowing the bones to be bent and deformed according to the mechanical forces acting about them. This stage is painful and gives place in time to a sclerosing osteitis, and a great thickening of the compact tissue, especially in the concavities—the replacement of the cancellous tissue by sclerotic bone, and the obliteration of the medullary canal.

In conclusion, I may add a word of appreciation to Mr. Newlove, Pathological Assistant, Khartoum Civil Hospital, for the photographs of the case which he took, and to Dr. Salim Attyieh, of the Omdurman Civil Hospital, for his kind help.

Khartoum, May 13, 1918.

Section of Pathology.

President—Dr. BULLOCH, F.R.S.

Disruptive Phenomena in Gunshot Injuries.

By S. G. SHATTOCK, F.R.S.

De effectibus dirumpentibus missilium quae in bello usui sunt.

SUMMARIUM.

HUJUS diruptionis exempla simplicissima visceribus in compactis monstrantur.

Quum perforatur jecur, exempli gratiâ, missili celerrime movente, scinditur viscus, in radios saepe, fragmentis quoque fortasse disjunctis. E contrario missilia si tardius progrediuntur, jecur perterebrant, missili in situ nonnunquam manente.

Quaerere oportet an haec diruptio ascribi debeat aeris undulae quam projicit missile.

Explicationem hanc totaliter negandam esse plurimis modis probatur.

Si perforatur papyri charta tenuissima super frameam tensa aperturam vix majorem esse quam missile ego reperivi ; haud sufficit aeris undula ad papyrum extra aperturam scindendum.

Effectus dirumpentes ascribere oportet impetui missilis per jecoris substantiam, mollem sed incompressibilem, perforantis.

Missilis rotatio nihil interest.

Sic accidit in renis quoque laesionibus; in splene et in cerebro.

Quam missilis velocitas tam laesionum magnitudo.

Rarius observatur diruptio in visceribus cavis, in ventriculo aut in intestino [in pulmonibus nunquam] quum aer his in omnibus inclusus facile comprimitur.

In vesicâ, e contrario, si urinâ perdistenditur haec diruptio nonnunquam observatur: apertura introitūs parva, illa exitūs magna atque scissa, urinâ parietem contra remotum propulsâ.

Demonstrari possunt hi effectus in vesicâ humanâ post mortem ablatâ et aquâ perdistensâ; introitus parvus, exitus diruptus.

De ossium fracturâ, superadditur structurae rigiditas quâ laesio magnificatur. Quamlibet gradatim in machinâ comprimitur, etsi apud locum bene limitatum, tibiae diaphysis—e.g., comminuitur longe lateque a loco compresso. Item tamen accidit in ossibus longis ut in visceribus compactis: quam missilis velocitas tam laesionum magnitudo.

In cranio, ut bene cognoscitur, diruptionis effectus in gradibus maximis apparent, si missile celerrime movet; calvaria tota late comminuitur, suturis quoque disjunctis.

Hi causantur effectus luxatione cerebri subitâ (substantiae mollis atque incompressibilis) cranii ab intro.

What is there peculiar in a gunshot injury? Is any new factor superadded to those which obtain in other injuries resulting from the forcible intrusion of foreign bodies? That such wounds are, speaking generally, contused and infected goes without saying; but in this they do not differ from wounds produced by other foreign bodies. And gunshot fractures are necessarily compound, except in the few cases where they are caused by the oblique impact of larger missiles which may occasion no accompanying breach of surface. The depth of penetration due to the velocity of the projectile; the number and variety of the injuries resulting from its passage, and the fact that the missile may remain in the body: all of these, doubtless, contribute to give such injuries special surgical features. But from the more strictly pathological standpoint the new factor introduced into gunshot injuries, as injuries, is the velocity of the missile. And it is from this aspect that I propose to consider them by means of the specimens received at the Royal College of Surgeons, from the seat of war in France, during

the last three years; and from experimental observations carried out in connexion with this subject.[1]

It will simplify the subject to take injuries of soft structures first, and afterwards those of bone. The importance of knowing by what missiles the injuries were inflicted will be obvious in this connexion: whether by cylindro-conoidal pointed rifle bullets, spherical shrapnel bullets, or other forms of shrapnel, since the objects packed in the shrapnel shell may be any oddments of metal besides bullets; or lastly, whether by fragments of the exploded shrapnel shell itself, by pieces of high explosive shell, or of hand or rifle grenades. The velocity of a shrapnel bullet is considerably lower than that of a rifle bullet at the same range, and for this reason the effect may be widely different. These details, however, in regard to the missiles themselves, are by no means always forthcoming, and their absence has led to erroneous conclusions with respect to the physics of such injuries. A considerable fragment of exploded shell, even though not at high velocity, will cause as extensive an injury as a bullet at full speed, by reason of its size, its irregularity, and oscillation. And further, the gross damage inflicted by a rifle bullet is modified not only by its range or velocity, but by such factors as the following: whether the missile keeps its axis and passes straight through a part, or whether it rotates on its transverse axis before or after entry, so as to travel with its side in part, or directly, forwards; whether it is actually somersaulting; whether it ricochet before striking, and so enter obliquely or side on, with an unsteady movement, or in a distorted condition from the damage it has received. And, lastly, the oscillation present as the bullet leaves the rifle, and which, after losing, it reacquires when its velocity diminishes, adds to the damage resulting from its passage, independently of any other factors associated with it.

---

[1] Certain of the specimens have been described by different writers in the *Journal of the Royal Army Medical Corps*, the *Journal of British Surgery*, the *British Medical Journal*, the *Lancet*, and elsewhere, but in an isolated manner, and for other purposes than that for which they are here brought together. The numbers attached to the specimens are those given to them as they were received at the College. The chief part in the dissection and preparation of the material has fallen to my colleague, Mr. C. F. Beadles, the Assistant Pathological Curator, who has also helped me in other equally important directions. The organized collecting of the material from the seat of war in France was commenced in 1915, a Committee being appointed by the War Office with the object of compiling a Medical History of the War. The supervision of this work was entrusted to Major T. R. Elliott, F.R.S.; although the private enterprise of Sir George Makins and Captain H. G. M. Henry had, before that, furnished the College with not a few valuable specimens. To Professor Arthur Keith, F.R.S., lastly, is due the organization for the reception of the material at the Royal College of Surgeons.

Under the term "explosive effect" more than one thing is included. It may be applied (1) to the increase of damage due to shattering of the bullet; (2) to the additional injury resulting from the comminution of a bone and the forcible dispersal of its fragments, accompanied, perhaps, with the extrusion of muscle and splitting of the skin on the distal side.

One typical example of this (No. 1393) is contained in the Collection. It is the thigh of a man who died from shock and hæmorrhage a few hours after being wounded. The injury was caused by a small shell fragment which produced an extensive comminuted fracture of the femur at the junction of its upper and middle thirds. The cutaneous entry is a jagged slit $1\frac{3}{10}$ in. in length, on the anterior and outer aspect, near the top of the thigh; the exit is a long, gaping rent in the skin, $5\frac{1}{2}$ in. in length and $3\frac{1}{2}$ in. in breadth. Through this, which lies in the outer and posterior part of the thigh, there protrudes a hemi-ovoidal mass of muscle, of corresponding bulk.

A second example is sufficiently interesting to cite: A right leg (294) viewed from the inner aspect, showing a huge, gaping wound reaching from end to end, accidentally produced whilst the patient was cleaning his rifle. In the expanse of ruptured muscle many fragments of the shattered tibia are recognizable, some of which have been displaced laterally into the tissue. The bullet entered the knee, splitting off a piece from the lower margin of the patella; it then traversed the tibia, entering through the head, and emerging a short way above the ankle-joint. The injury was received on February 20, 1916. March 1: Pus and gas bubbles escaped from the knee-joint on pressure. Successful amputation was performed through the middle of the thigh.[1]

It is, however, the explosive effect resulting from (3) high velocity that alone possesses any special pathological interest, and which is particularly kept in view in the present communication.

[1] Amongst the drawings from the seat of war, deposited in the College, there is one showing a small circular entry in the upper arm, produced by a rifle bullet at 50 yards; and an exit represented by a gaping rent in the skin, $4\frac{1}{2}$ in. long by $3\frac{1}{4}$ in. broad, through which a mass of muscle is exposed. There was no fracture of the humerus. In this case the missile probably turned in its transit so as to emerge side on. From the middle third of an amputated leg, I removed both bones by carrying a long narrow amputating knife closely round each; the parts were afterwards tightly ligatured at either end, and firmly secured in the centre of a wooden frame, with the muscles of the calf on the far side. The leg was then shot through exactly in the mid-line, with a service rifle and pointed bullet, at a distance of 20 feet. The entry and exit were equally small.

INJURIES OF SOLID VISCERA.

The liver, by reason of its bulk and uniformity of structure, offers the best field for the study of gunshot effects upon a soft, solid organ. Injuries inflicted by rifle bullets at close range exhibit the explosive phenomenon in a marked degree. Even pistol bullets fired with suicidal intent will produce a notable amount of damage in this organ. There is in the Museum of St. Thomas's Hospital, portion of the left lobe of the liver from a man aged 28, who died five and a half hours after shooting himself. Around the aperture of entry on the front of the organ, the hepatic substance is fissured in a stellate manner, the rays being five in number, almost equidistant and of fairly equal length, averaging 4 cm. (1½ in.). The exit is also five-rayed, one ray being 5 cm. (2 in.) in length and the others averaging 2 cm. (¾ in.); between the two apertures there is an irregular, yet direct, patulous channel resulting from loss of substance. The missile is a cylindro-conoidal, unmantled bullet, not more than 1 cm. in length and 0·7 cm. in diameter. The element of reduced support on the side of the organ last perforated, as compared with that penetrated first, is one that may be ignored; if there is an inequality between entry and exit, the amount of damage is greater at the former. In these respects the injury offers a marked contrast to gunshot fractures of the cranium, where the rigidity of the structure perforated, and the difference in density between the bone on the one side and that of the brain on the other, are conditions unrepresented in the case of the liver.

In the ideal perforating bullet wound, the damage around the track takes the form of radial fissures. This is not invariably so. The concomitant injury in connexion with a perforation may be a single rent, part of which lies on one side, and part on the other, of the track. This difference, *ceteris paribus*, may be explained by the disturbing factor arising from the disposition of vessels and ducts in the fibrous extensions of Glisson's capsule. Similar variations, I find, are obtainable if the liver is perforated after death with the ordinary post-mortem measuring cone. If a cylinder is first cut out from the organ with a cork borer of the diameter of the blunt apex of the cone, and the cone is then forcibly twisted through the hole, the rent, as seen on withdrawing the instrument, is usually single, part on one side and part on the other, of the perforation; now and then it is triradiate, or more complex. The splits follow the planes of least resistance, and so tend to run between the main vessels—i.e., parallel with, rather than across, them.

The liver, moreover, illustrates by contrast, gunshot injuries unattended with explosive effects; and, again, the varieties of gunshot wounds arising from direct perforation, from guttering and grazing, are all so well shown by the specimens in the Collection that they may be referred to in detail as types of every possible injury occurring in solid viscera generally. One class of injury alone is unrepresented—viz., the contusion without accompanying breach of surface, which is not infrequent in the lung and tne intestine. The occurrence of simple contusion in the organs mentioned is explicable, partly by their extreme mobility and partly by their ready compressibility, seeing that they normally contain air, or gas, or both, whilst the hepatic substance is incompressible.

Fissured Perforations, of the Stellate and Linear Varieties.

In the selection of these and other injuries, I may utilize the descriptions of the specimens as drawn up by myself, adding the histories furnished by the collectors of the material. The fissuring accompanying the perforation may be stellate on one aspect and linear on the other.

Liver (495): Showing a high degree of radial fissuring involving the lower surface of the right lobe as far as the gall-bladder, accompanying a perforation caused by an intact bullet; the lacerations average 2 in. in length; one involves the whole of the right border: centrally there is some depression due to direct loss of substance. On the upper aspect, the fissuring is likewise very extensive, large portions of the substance being almost detached. The bullet entered between the fourth and fifth lumbar spines, passing through an intervertebral foramen, and thence through the right kidney, liver, diaphragm, and lower lobe of the lung, grazing the middle and upper lobes. After fracturing the fourth and fifth ribs it came to rest in the anterior border of the right scapula, where it was found after death, intact. Death occurred immediately on admission. Post-mortem: Right hæmothorax; blood in the peritoneal cavity.

Such a specimen represents the least complicated form of direct injury by rifle bullet. But in other cases it might be doubtful whether every extraneous factor is excluded: a rib may have been first fractured and fragments carried into the track; or clothing, or portions of

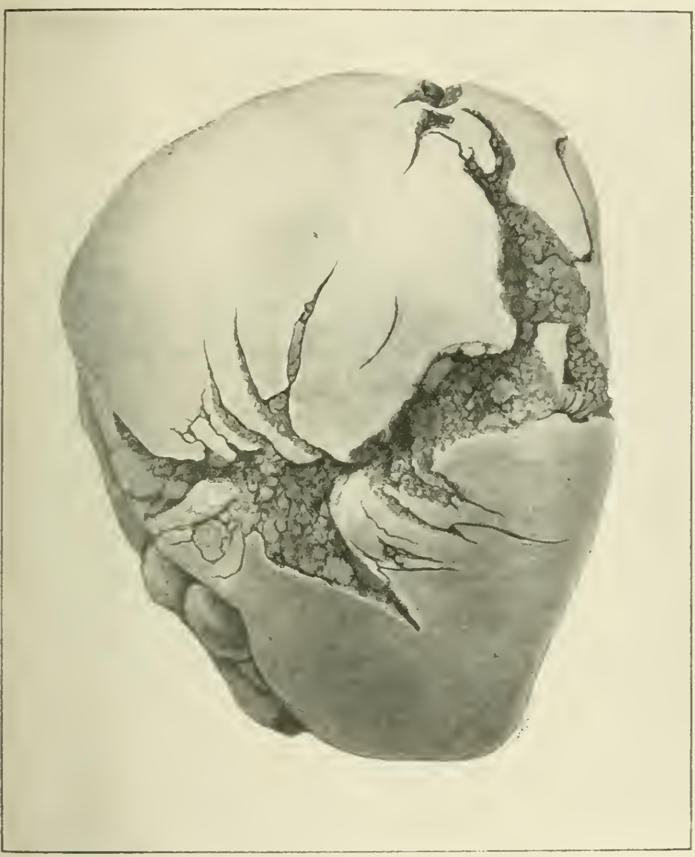


Fig. 1.

Human liver, showing explosive effect produced by rifle bullet, the substance being widely split and comminuted around the perforation. Photograph, reduced to $\frac{5}{6}$.

Figurae explicatio.

Hominis jecur, effectum monstrans dirumpentem. Circum aperturam jecoris substantia longe lateque scissa atque comminuta est. Pictura photographica; paulum deminuta.

accoutrement. Thus in the following case the injury was caused by a shell fragment which, before traversing the liver, fractured the twelfth rib, and carried pieces of clothing into the wound.

Liver (63): Showing a perforating wound, 5 in. in length, in the right border of the right lobe. Entry: In the right flank in the posterior axillary line; the twelfth rib, fractured near its anterior end. Into the track were carried pieces of clothing. After perforating the liver, the shell fragment had penetrated the lung, in the apex of which it was found: hæmothorax. The hepatic substance is longitudinally split over the greater part of the track; the exit is a patulous slit 3·2 cm. (1¼ in.) in length. The hepatic tissue bounding the fissure is necrotic and blood-stained. As seen in the divided surface, there is a long fissure in the hepatic substance, on the deeper aspect of the perforation: the plane of section is about 1 in. posterior to the track.

Here the longitudinal split over nearly the whole course of the perforation is due to the close proximity of the latter to the free border of the organ.

The only method of eliminating all extraneous factors is, of course, to observe the results experimentally produced upon the isolated organ. Four fresh sheep livers (not hardened in any fixative) were shot through the middle of the right lobe (4 cm., 1½ in., in thickness) with a service rifle and pointed bullet, at a distance of 20 ft. The organs were suspended in succession from a wooden frame by means of a metal skewer run through the upper border, and were allowed to rest lightly by the lower upon cotton wool. In each a marked explosive effect ensued. There resulted a patulous hole due to loss of substance, from which a varying number of fissures radiate. The fissuring was more regular at the entry than at the exit. The entry from the best example is shown in the accompanying figure. From the central perforation there proceed eight radial fissures, the extreme length of the injury, including both sides from the central perforation, measuring 3½ in. The exit was a single linear fissure 3 in. in length. In a coronal section carried midway between the entry and exit, the fissures extend as far from the line of perforation as at the front, and preserve a radial disposition which corresponds fairly closely with the direction of the vessels. Microscopic sections were made at a distance of an inch from the extremity of one of the fissures, at right angles to it, and so as to include the whole of the vertically divided area of the right lobe: no fissures were discovered.

The production of a similar injury in the human subject by shell fragment is illustrated in the following specimen.

Liver (372B): Showing an extensively fissured perforation directed from below upwards. The entry is stellate, five-rayed, the chief fissure being 2 in. in length. The exit is a fissure 4 in. long, with two considerably smaller leading from near its anterior end. The left lung was subsequently bruised by the missile, which was a quadrilateral flattened fragment of shell 2 cm. by 2·5 cm. along its sides: this lay beneath the skin near the site of exit. The spleen and left kidney were also injured.

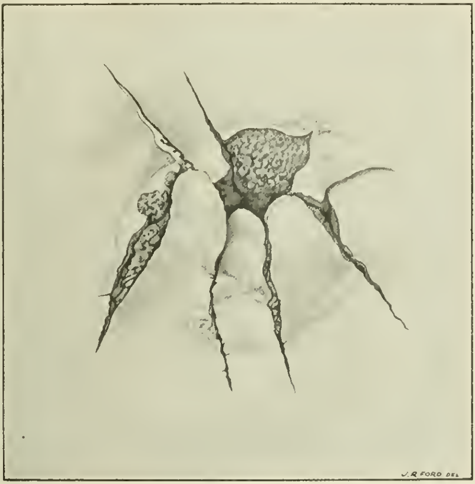


FIG. 2.

Sheep liver, suspended, and shot through at 20 ft. with a service rifle and pointed bullet, showing explosive effect; radial splitting around the perforation. Natural size.

Figurae explicatio.

Ovis jecur post mortem ablatum et suspensum antequam perforatum est, effectum monstrans dirumpentem. Circum aperturam jecoris substantia in radios scissa est. Magnitudinis naturalis.

Liver (666): The right lobe showing a long rent on the anterior aspect; the organ is extensively and somewhat radially fissured posteriorly. The missile, taken to be a shell fragment, afterwards perforated the pericardium and apex of the left ventricle; it was not found after death, which occurred two days from the date of admission. The entry in the thoracic wall was diagnosed as a shell wound. Here the perforation of the liver probably took place from below upwards, the long, simpler fissure representing the exit.

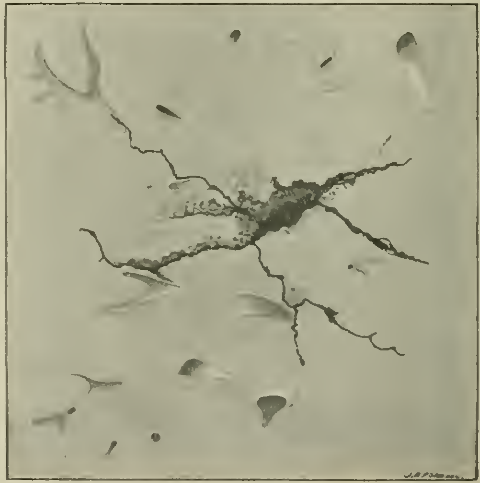


Fig. 3.

A coronal section of the preceding liver, showing the extent and radial disposition of the fissures in its mid-substance, the direction of the fissures corresponding fairly accurately with that of the vessels. Natural size.

Figurae explicatio.

Jecoris praecedentis sectio coronalis monstrans in mediâ substantiâ fissuras longas in radiis dispositas ut illas apud introitum. Magnitudinis naturalis.

In the following specimen the same linear form of exit is shown, the entry having probably been through the vena portæ. The injury in this case was produced by a bullet.

Liver (101): Showing a large, irregularly fissured gunshot injury on the upper aspect; in the divided surface there is shown the extension of a fissure filled with blood-clot; at the back of the specimen, in the under surface of the same lobe (the left) there is another long fissure accurately covered with adherent coagulum. The centre of the lesion on the upper aspect is an irregular shallow pit due to loss of substance, in the line of the umbilical notch, $2\frac{1}{2}$ in. behind the anterior border. From this a fissure 4 in. in length involves the upper part of the left lobe: and shorter fissures radiate from the same centre. Cutaneous entry, in right flank; bullet found beneath skin near the apex of the heart; injuries of the colon and stomach had been sutured.

There was no second aperture in the portion of the right lobe which was cut away after death. The anomalous fact that there is but a single aperture, and that an extensive one, suggests that the entry was through the vena portæ.

The extensive nature of the shell injuries in the foregoing specimens indicates that they were inflicted by shrapnel bursting at close range, or by fragments of high explosive shell; but no details on this point are available. In the following case, however, the missile is definitely stated to have been a fragment of high explosive shell.

Liver (935): Showing a perforation towards the posterior border of the right lobe caused by a fragment of high explosive shell. The entry is a gaping crucial split, with a depressed centre resulting from loss of substance, each ray measuring $1\frac{1}{4}$ in. from the centre; from the anterior extremity of the anterior of the fissures there leads off another, $1\frac{3}{4}$ in. in length, at right angles to it, and towards the free right hand border. The exit is triradiate, each split being about an inch in length. A considerable amount of the hepatic substance has been shot away. Wounds of the chest and abdomen. Death twenty hours later, apparently from hæmorrhage. There was in addition an injury to the upper pole of the right kidney.

In one instance, and in one only, the stellate fissuring around the exit of the perforation is curiously curved. The rifle bullet before perforating the right lobe of the liver had traversed the body of the third lumbar vertebra, its cylindrical segment having as a result undergone lateral flattening.

Liver (497): Showing a perforation by rifle bullet of the right lobe towards the thick border, from below upwards, accompanied with pronounced radial fissuring. The fissuring about the upper aperture (exit) is regularly radiate, and comprises nine or ten rays averaging

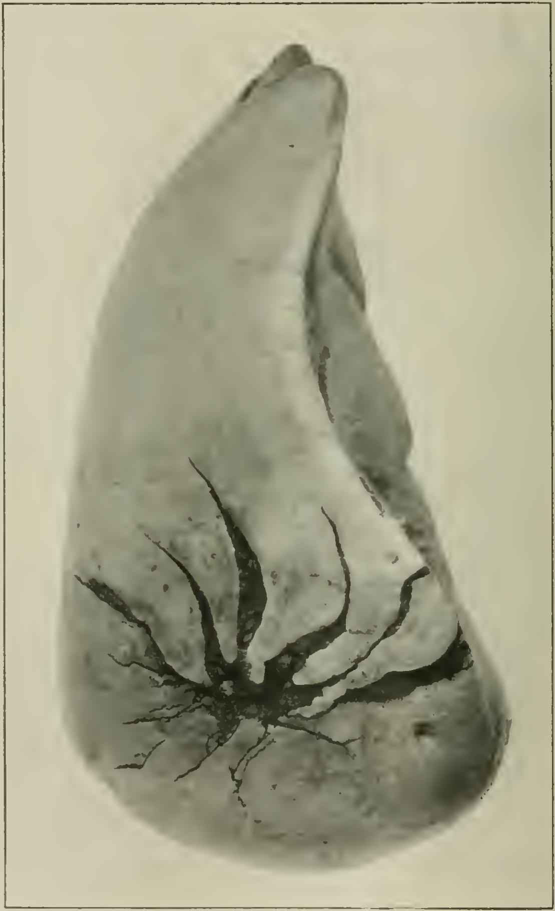


Fig. 4.

Human liver; perforation by rifle bullet, the fissures around the exit being regularly curved in a very unusual manner. Photograph, reduced to $\frac{5}{6}$.

Figurae explicatio.

Hominis jecur, effectum monstrans dirumpentem. Fissurae circum aperturam in modo rarissimo curvatae sunt. Missile vertebram lumbalem tertiam prius perforaverat, et a latere compressum fuit. Pictura photographica; deminuitur ad $\frac{5}{6}$.

1½ in. in length, and having a remarkably equidistant and curved character, so as to resemble the curved spokes of certain wheels. The fissuring on the lower aspect is likewise stellate, but the rays, of which three are 1½ in. long, are straight. Two of the fissures pass through the convex border of the organ. Death occurred shortly after admission. Cutaneous entry, in left flank, lower pole of kidney grooved, body of the third lumbar vertebra perforated, cauda equina damaged, right kidney comminuted, right lobe of liver perforated, diaphragm torn, lower surface of right lung contused. Exit through the tenth rib, beneath the skin over which, the bullet lay. The missile is a rifle bullet, and except at the apex the mantle and core are flattened, the former being split and the core partly extruded at the base.

This is the only example of such a curvature in the fissures accompanying perforation, and indicates that an exceptional rotation has been imparted to the bullet, which was flattened, moreover, by its passage through the third lumbar vertebra before traversing the liver.

Detachment of Portions.

If the perforation occurs near the margin of the liver, pieces may be completely detached.

Liver (444) : Left lobe : the free lateral border has been almost detached by a rifle bullet at close range. The line of detachment is 5 in. in length, and from it, fissures lead off in a radial manner into the lesser and the main fragments : the chief fissure on the under aspect of the main fragment is 4 in. in length, and it runs obliquely backwards. The bullet has evidently traversed the part, parallel with its broad surface, and split it into two. Cutaneous entry at the ninth rib, in the mid-axillary line ; exit at the sixth costochondral junction. Death four hours after the injury.

Complete Division.

The nearest approach to a complete division into portions of approximately equal size, is the following :—

Liver (556) : Towards its anterior border the right lobe is nearly divided into two in the transverse direction, the gall-bladder being likewise torn across. The injury was caused by a shell fragment, which entered through the ninth interspace and tenth rib, in the posterior axillary line, and eventually lodged in the anterior abdominal wall to the right of the mid-line. Death twenty-four hours after the injury. Neither lung was wounded, nor collapsed; there was blood in both pleuræ; the urine was likewise bloody.

Gutter Wounds.

If the bullet plough or gutter the surface, at high speed, explosive effects are produced, except that they are, of course, unilateral. Such an injury may be viewed, in fact, as a hemi-perforation.

Liver (108): Showing a very extensive comminuted injury involving the upper surface of the right lobe, over a somewhat oval area, 5 in. in its longer diameter. Centrally there is, in the longer axis, some loss of substance, and from this spot about fifteen fissures radiate. The damaged area is unnaturally elevated, apparently from interstitial hæmorrhage, so as to produce a kind of hernia—hernia hepatis, as it might be named. On the lower aspect of the right lobe, but unassociated with an exit, there is an oblique fissure 2½ in. in length, which reaches the site of the gall-bladder; and there is a further triradiate fissure in its vicinity. Cutaneous entry of bullet, in right fifth interspace, 2 in. from the sternum; exit, in the subcostal region on the right side, in the mid-axillary line. The bullet was fired at short range.

Liver (165): The upper part of the right lobe, from the surface of which there projects an oval elevation 4 in. in length, over the summit of which the capsule is widely split; and through the gap in which there protrudes broken-down and fissured hepatic substance mixed with blood, a hernia hepatis. The damaged area corresponded with a rent in the diaphragm 3 in. in length, both injuries being due to the horizontal course of the missile, which was taken to be a bullet. There was in addition a gutter wound of the base of the right lung. Death occurred three days after admission. Cutaneous entry, ½ in. to the outer side of the right nipple; exit, 2 in. from the mid-line on the right side, about the level of the eighth rib; right hæmothorax.

Grazing.

Should the penetration of the surface be still less, some form of linear fissure alone results.

Liver (494): Showing a single fissure 4½ in. in length on the front of the right lobe, without any lateral extensions. Death, forty-eight hours after admission. The missile is represented by two fragments,

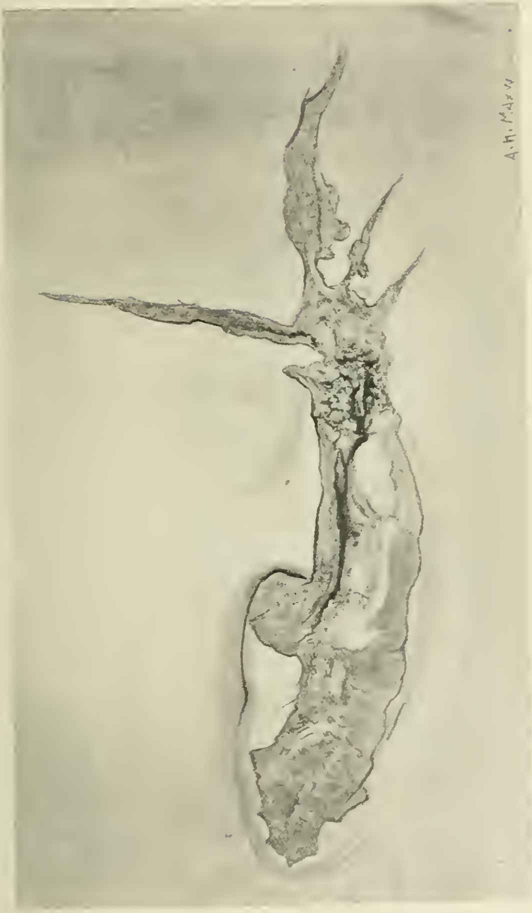


Fig. 5.

Human liver, showing a straight fissure on the upper aspect, due to grazing by a shell fragment. At the most prominent spot (that first struck) there is some radial fissuring. Natural size.

Figurae explicatio.

Hominis jecoris lobus dexter desuper inspectus. Monstratur fissura missili causata quod visceris faciem in transitu tetigit. A loco primum percusso fissuræ quaedam in radiis extendunt.

one, the aluminium cone in the pointed end of the British bullet; the other, a distorted piece of the mantle, including the cap of the cone. Autopsy, made the day after death, March 25, 1916: Pronounced aëration of the tissue from post-mortem growth of *Bacillus aërogenes.*

Here the absence of accompanying lateral fissure may be ascribed to the fragmentation and reduction in the velocity of the missile, probably from its having struck bone or some other resisting object, before reaching the liver.

Liver (43): Upper portion of the right lobe, showing a grazing fissure accompanied at its sides and beyond its distal termination, with superficial abrasion, due to the passage of a fragment of shrapnel. The end of the fissure over the most convex part of the surface (that more directly struck) is to some extent radiate. Death occurred from hæmorrhage from a pyloric ulcer.

The absence of collateral fissuring in grazing injuries is explained by the absence of compression of tissue in front of the advancing missile; in this they differ from gutter wounds, even though caused by rapidly moving projectiles.

Increased Damage due to Fracture of Overlying Ribs.

The following specimen may be cited as illustrating the increased damage resulting from fracture of the overlying ribs:—

Liver (618): Showing an extensive injury, 5 in. in length, involving the upper aspect of both lobes, and caused by a rifle bullet at 100 yards' range. In the left lobe the injury takes the form of a deep fissure, with an offset about 1½ in. in length, near its extremity. In the right lobe the injury consists of a main fissure with two secondary running backwards from its posterior border; the hepatic substance, about the central part of the injury, is widely broken down (and some is wanting) over an area extending to the anterior border. On the inferior aspect of the left lobe, there are two undulatory fissures, each about 1½ in. in length; and there is a third involving the adjacent border of the right lobe, at right angles to the gall-bladder. Death, six hours after injury.

Chest wall (618): Portion of the right side, from the preceding case, showing a horizontal gap 1½ in. long, in the anterior axillary line; 3 in. of the sixth and seventh ribs have been destroyed. In addition to the wound of the liver, the diaphragm was torn. There was, moreover, a minute puncture in the anterior wall of the stomach near the pylorus, and a small injury of the opposite wall, apparently caused by the same fragment. The bullet was broken up; three pieces of it were found near the xiphoid.

The position of the deep depression in the liver exactly corresponds with the extensive gap in the thoracic wall.

Tunnelled Wounds.

In contrast with these extensive lesions, are the tunnelled wounds of the same organ, accompanied with little or no macroscopic damage, other than the loss of substance corresponding with the size of the missile. The track preserves a fairly uniform diameter even when of noteworthy length. The comparatively small variations in this respect, and slight deflections from the straight line indicate the results of oscillation, or even somersaulting of the missile, which is almost invariably a shell fragment or similar object, although a bullet that has lost its velocity may produce a similar channel. That such tunnels result from the transit of missiles at low speed is shown by collateral details. The missile producing them is, as just stated, nearly always a fragment of shell. In five of the specimens it lies at the far end of the channel, its velocity having been insufficient to carry it completely through the viscus. In another, after perforating the liver, the missile

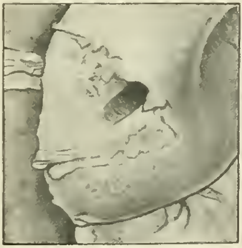


Fig. 6.

Human liver, showing a small tunnel in the quadrate lobe, the missile remaining *in situ*. Natural size.

Figurae explicatio.

Hominis jecur. Monstratur canalis parva (in longitudinem 2 cm.) in lobulo quadrato terebrata, missili in situ manente. Magnitudinis naturalis.

came to a standstill in the lung; and in another, immediately beyond the liver itself. In some the missile is a shrapnel bullet; and if a rifle bullet, it may be safely assumed that its velocity was low.

(1305): Portion of a liver showing a small, well-defined, quadrilateral, blind, and patulous tunnel, in the quadrate lobe, produced by a slowly moving fragment of shell of corresponding diameter, which lies at the bottom. The length of the tunnel is 2 cm. ($\frac{3}{4}$ in.), its breadth 0·5 cm. ($\frac{1}{5}$ in.). Cutaneous entry, below twelfth rib of the left side, the track passing diagonally upwards, forwards, and inwards to the tenth dorsal vertebra, thence to the right in front of the aorta, and above the pancreas to the quadrate lobe. Suppuration occurred around the foreign body, tracking along the ascending colon down to the pelvis, the pus being shut off from the general peritoneal cavity by firm adhesions. The drainage from the track took place intraperitoneally, the superior portion of the track tending to close. There was a second wound penetrating the abdomen from the left side of the back. Death occurred three weeks after the injury.

Liver (180): Showing a tunnelled track, slightly curved, 5 cm. (2 in.) in length, produced by a shell fragment, nearly the size of a German bullet, which lies in its distal end. The channel is lined with bile-stained necrotic tissue.

Liver (532): Showing a short, somewhat broad, irregular tunnel, 2·5 cm. (1 in.) in length, at the end of which lies an irregular fragment of shrapnel. The missile passed through the base of the lung and the diaphragm, and lodged in the liver. There is no fissuring about the tunnel. The tissue around the missile is necrotic. Death six days after injury. Post-mortem: Right hæmothorax, collapse of lung. The hole in the diaphragm was quadrilateral.

Liver (1385), with portion of the diaphragm: Showing a patulous channel, about $1\frac{1}{2}$ in. length, at the distal extremity of which there lies the fragment of shell which has produced it. The suprajacent surface of the right lobe is covered with lymph, as is likewise the corresponding lower surface of the diaphragm, suppuration having taken place between the two. In the anterior edge of the diaphragm is shown part of the aperture in this, through which the missile reached the liver. The patient was wounded on March 12, 1917. March 20: Explored for hæmothorax; foul bloody fluid discovered; partial resection of eighth rib. March 23: Hæmorrhage occurred from a wound over the scapula. Death, April 1. Post-mortem: Fracture of a rib on the right side, in the mid-axillary line. There was a subdïaphragmatic collection of bile-stained pus over the right lobe of the liver; right septic hæmothorax, drained through the resected rib; lung collapsed. There was a foreign body between the lung and pericardium, but no pericarditis.

In the following specimen the formation of the tunnel is due to a shell fragment accompanied with two small pieces of fractured rib.

Liver (1472): Right lobe showing a tunnel of greater irregularity than usual, filled with blood-clot, and caused by a shell fragment which lies at its distal end, and just projects from the free surface. At the same end of the canal there are impacted two small fragments of rib. March 16, 1917: Two small shrapnel wounds in back of the right thorax over eighth and ninth ribs. March 30: Hæmothorax aspirated; signs of its infection appeared, with areas of pulmonary consolidation. Post-mortem: The track was found to pass through the pleura and diaphragm into the liver; the right kidney was wounded by a second fragment of shell.

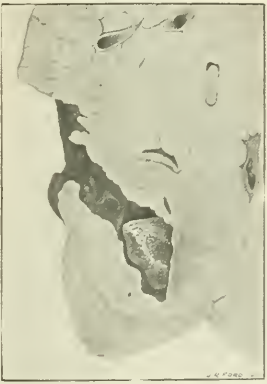


FIG. 7.

Liver showing a blind patulous channel, 1½ in. in length, at the bottom of which there lies the shell fragment which has produced it. Natural size.

Figurae explicatio.

Hominis jecur. Monstratur canalis in lobulo dextro terebrata, missili (metalli fragmento) in situ manente.

Liver (210): Showing part of a tunnelled track through the upper portion of the right lobe, caused by a shell fragment which was found after death at the coronary ligament of the liver. The length of the tunnel shown is 2·5 c.m. (1 in.); its exit is a clean, almost circular hole, without any surrounding fissuring. Post-mortem: Cutaneous entry, 3 in. from the mid-line at the back, fracturing the tenth rib; right pleura, full of frothy blood.

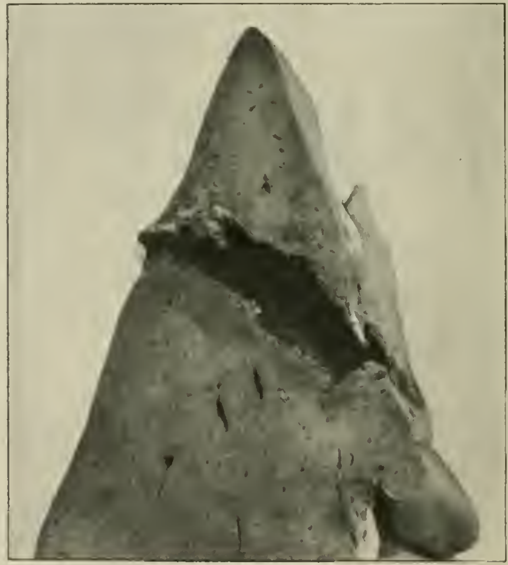


Fig. 8.

Human liver, showing a tunnel bored through it by a slowly moving missile; a shrapnel bullet. Natural size.

Figurae explicatio.

Hominis jecur. Monstratur canalis (in longitudinem 5 cm.) per viscus terebrata, missili tardius progrediente. Pictura photographica. Magnitudinis naturalis.

(429): Showing a tunnel produced by a shrapnel bullet. The track is 5 cm. (2 in.) in length, and traverses the right lobe, obliquely, near the thinner anterior margin: its interior is bounded by bile-stained necrotic tissue. Cutaneous entry, to left of spinous process of the twelfth dorsal vertebra; left kidney much damaged; intestine and stomach uninjured. Death from sepsis.

There is no fissuring in connexion with the hepatic exit; there is one short tear in connexion with the entry.

Liver (638): Showing a tunnelled perforation 15·5 cm. (6 in.) in length, passing from the outer margin of the left lobe, through this lobe, and across the upper part of the right. There is some insignificant fissuring around the aperture in the right lobe; about the aperture in the left, there is none. The track is slightly devious, and is lined with débris and blood-clot; the tissue immediately around it is opaque and necrotic. The injury was, doubtless, produced by a shell fragment.

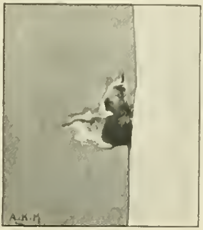


Fig. 9.

Human liver, showing one half of the exit of a long patulous tunnel produced by a shell fragment; there is no fissuring, except of an insignificant kind, around it. Natural size.

Figurae explicatio.

Hominis jecur; exitūs dimidium monstrans canalis longae et patentis per viscus terebratae, missili (metalli fragmento) tardius progrediente. Fissurae nisi minutae apud aperturam absunt. Magnitudinis naturalis.

Liver (635): Coronally bisected behind the gall-bladder. The whole of the right lobe is obliquely tunnelled, the patulous track being lined with bile-stained necrotic débris. The channel widens at the lower end, that of entry, so as to be trumpet shaped; the exit is unaccompanied with any fissuring; in connexion with the entry there are two fissures, each about 1 cm. in length. From a case of wound of the right flank. The missile was a piece of shrapnel 3 cm. in length, and 1·3 cm. across its base, and is of very irregular form in detail. Death, three days after admission. The track varies slightly in diameter in its course, indicating that the missile had oscillated or turned in its progress. In the fold of peritoneum forming the suspensory ligament, there is a hole admitting a pencil, through which the missile passed after traversing the liver.

In one example the perforation of the liver is accompanied with that of the inferior vena cava.

Liver (1454): Perforated by a fragment of shell which has also produced a perforation of the anterior wall of the vena cava. The missile entered the right chest in the posterior axillary line about the ninth rib, perforating the diaphragm and the right lobe of the liver. Death, the following day. Post-mortem: No clot was found adhering to the site of the perforation in the vein; right hæmothorax, caused by the aspiration of blood from the liver, through the rent in the diaphragm, the lung itself being uninjured.

Under such circumstances the missile might readily enter the vena cava, and shift for some distance along its lumen—an event which has been observed elsewhere, and of which instances will be referred to later.

The following is one of the only two examples in which tunnels of this kind have been produced by bullets; and in both it may be assumed that the missile was only slowly travelling.

Liver (309): Portion of the left lobe, showing, about 2 in. from its free border, a straight tunnelled or patulous perforation 2 in. in length, the parts being artificially divided from the free border into the track. The edge of exit, on the convex aspect, is radially fissured, but to a very slight extent; that of entrance, on the concave side, is slightly more so. The margins of the channel are opaque from necrosis; and, as shown in the divided lower surface, the necrosis extends a considerable way from the track of the injury. Admitted March 8, 1916, with perforating bullet wound of the abdomen. A wound in the lesser curvature of the stomach was sutured, and the entry wound and peritoneal cavity were drained through the loin. The pancreas was likewise damaged. Death, from general peritonitis, four days later.

The contrast between explosive action and tunnelling, as dependent upon velocity, is graphically demonstrated in the late Sir Victor Horsley's experiments, which were made by firing into soft clay. These show that, for the first half or so of its course, the projectile, whilst at high speed, produces an explosive effect which leads to the formation of a spacious cavity in the clay, whereas the rest of the track is a simple tunnel which accurately corresponds with the size of the missile.

And lastly: The following specimen may be an example of hepatic injury due to the direct action of explosion, unattended with perforation.

Liver (615): On the upper aspect of the left lobe, over the more median portion, there are a series of superficial, slightly zig-zag fissures which diverge from the umbilical notch, and the longest of which reach almost as far as the left border. The organ is granular from fibrosis. From a man who was blown up by a land mine, and died five days afterwards. Only a few trifling bruises were apparent on the body; there was hæmorrhage into both orbits. None of the long bones were broken. Post-mortem: The lesser wing of the sphenoid and the cribriform plate were found fractured; some blood was discovered in the right middle ear. There was extensive meningitis. The fissures in the liver were closed, and not yielding blood. There was partial separation of the sixth costo-chondral junction. On the surface of the left lung were two emphysematous bullæ; and much fine hæmorrhage had occurred in the pleural membrane. The spleen was split on the inner aspect, the fissure being mostly concealed by a thick layer of blood clot; on bisection it exhibited many extensive areas of infarction.

The ruptures of the liver in this case were possibly due to the direct force of explosion; for they are all superficial, of wide lateral extent, and they diverge from the umbilical notch over the upper aspect of the left lobe, which is normally exposed to a considerable extent beneath the abdominal wall, and unprotected by the ribs and their cartilages.

Minimal Injuries of the Liver, and of other Organs.

I may close this list of gunshot injuries of the liver with what may be called minimal; minimal, that is to say, in regard to their actual size rather than their gravity—injuries produced by notably minute fragments of metal whatever their source. Such a class is represented in most of the organs, and likewise in the bones, of which instances will be referred to later.

Liver.

To take the liver first, the following is an example:—

Liver (651): Portion of the border of the right lobe, showing a minute perforation due to some correspondingly small fragment of metal which entered in the right loin and produced a similar punctured

EXPLANATION OF PLATE I.

Examples of minute missiles and of minute injuries produced by such in various structures.

- **A.** In the liver.
- **B.** In the intercostal muscles.
- **C.** In the lung.
- **D.** In two of the cusps of the pulmonary artery; the artery is slit beyond the cusp last perforated.
- **E.** The missile which caused the lesions **B**, **C**, **D**, and which was found lying between the pulmonary artery and the aorta.
- **F.** Femoral artery, perforated on one side, the intima and media being ruptured on the other, without perforation of the external coat.
- **G.** The preceding in vertical section.
- **H.** Missile which perforated the knee-joint, without producing fracture of bone.
- **I.** Urinary bladder; minute entry wound, as seen from within.
- **K.** Right ventricle of heart, showing a minute missile embedded in the interventricular septum. There was a minute perforation of the wall of the right ventricle. Hæmopericardium.
- **L.** Perforation of anterior wall of heart, the right ventricle being penetrated. The small missile perforated the left lung; the parietal pericardium, in two places, with the myocardium; and the right lung, in which it was finally impacted. All the lesions were minute.
- **M.** Portions of thigh in which are impacted minute pieces of hand grenade:—
  - (1) Showing two particles in the subcutaneous fat;
  - (2) One particle in the extensor femoris;
  - (3) Another particle picked out from the muscle.

All the figures are of the natural size.

TABULA I.

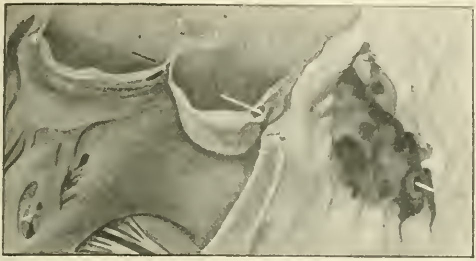
Figurarum explicatio.

Missilium exempla minutorum, magnitudinis naturalis, quibus causatae sunt laesiones insigniter minutae visceribus in diversis: in corde, in pulmonibus, in arteriis. Cum his repraesentantur viscerum diversorum laesiones missilibus minutis causatae.

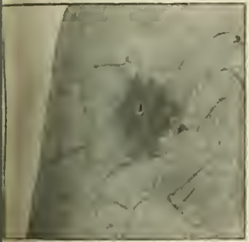
Figurae omnes magnitudinis naturalis sunt.

- **A.** In hepate.
- **B.** In musculis intercostalibus.
- **C.** In pulmone.
- **D.** In arteriae pulmonalis valvulâ; arteriae paries quoque extra valvulam perforatus est.
- **E.** Missile quo laesiones **B**, **C**, **D**, causatae sunt, et quod inter arteriam pulmonalem et aortam repertum est.
- **F.** In arteriâ femorali. Arteriae paries in latere uno solum perforatus: parietis oppositi et tunica intima et media scissae sunt sine tunicae externae perforatione.
- **H.** Missile quo perforatum est genu sine ossium fracturâ.
- **I.** Vesica urinaria: apertura introitûs ut ab intus apparet; apertura exitûs tam minuta quam illa introitûs.
- **K.** Cordis ventriculus dexter. Missile minutum in septo interventriculari infixum est. Haemopericardium.
- **L.** Cordis paries anterior. Monstratur in myocardio canalis minuta (in longitudinem 3 cm.), ventriculo dextro quoque perforato. Causata est laesio missili quod pulmonem sinistram perforavit, pericardium deinde in duobus locis cum myocardio, et pulmonem denique dextram, in quâ infixum est. Laesiones omnes minutae sunt.
- **M.** Cruris portiones in quibus infixa sunt missilia quaedam minutissima.
  - (1) Duae metalli particulae, in telâ sub cute adiposâ.
  - (2) Particula una in musculo (extensori femoris) sub cute jacenti.
  - (3) Particula alia e musculo extracta ut magnitudo ipsa monstratur.

PLATE I.

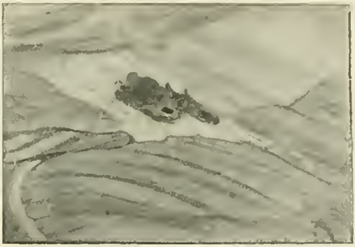


D

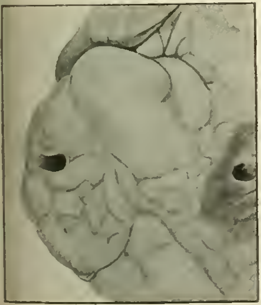


C

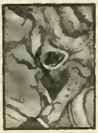
E



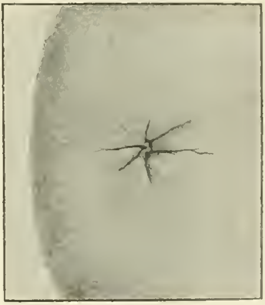
B



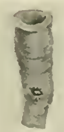
L



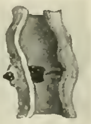
K



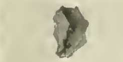
A



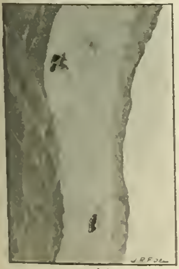
F



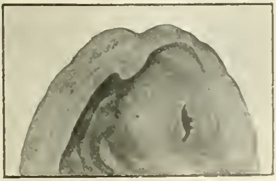
G



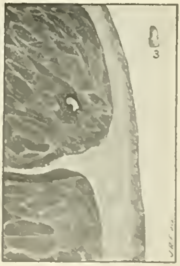
H



M(1)



I



M(2)(3)

perforation in the upper pole of the right kidney; the missile was not found. The track through the liver is 1 in. in length. The lower aperture, that of entry, is regularly and finely stellate, the rays, of which there are six, averaging 0·6 cm. in length; the upper, that of exit, is likewise radiate, the rays being slightly larger than those around the entry, and three in number.

From other organs the following may be selected for illustration:—

Spleen.

Spleen (478): Showing a small perforation in the convex surface, caused by a shell fragment; the aperture is linear and 0·5 cm. in length; the capsule immediately around, split in a stellate manner. The minute missile was found at the hilum in a tributary of the splenic vein. The organ was successfully removed for intra-abdominal hæmorrhage.

Though minimal in size the injury, nevertheless, necessitated the removal of the viscus.

Heart.

Heart (616): Showing a minute perforation of the wall of the right ventricle by a small fragment of shrapnel which became impacted in the interventricular septum. Extensive wounds of abdominal viscera. Death within twenty-four hours. After death 3 fluid oz. of blood were found in the pericardium.

Skin (616): From the foregoing case, showing a correspondingly minute perforation.

Lungs and heart (514): Showing the track of a small fragment of rifle grenade through the anterior border of the lower lobe of the left lung, through the pericardial sac and anterior wall of the right ventricle (which is opened), and thence into the inner side of the lower part of the upper lobe of the right lung. Injured by rifle grenade, March 23, 1916; fracture of the left elbow, wounds of the chest and right arm. There was a small wound ½ in. to the inner side of, and ½ in. above the left nipple. The heart sounds were normal; the chief symptoms were dyspnœa and cyanosis. Death fifty-nine and a half hours after injury. The missile had perforated the sternum before reaching the thoracic viscera. Post-mortem: Double hæmothorax. On opening the pericardial sac a small piece of khaki was found, together with a small quantity of clotted and fluid blood. The blood in the pleuræ came from a small hole in the right ventricle, through the perforations in the pericardium.

Heart (2219): The right ventricle has been laid open to show the internal orifice of a minute perforating track which leads through the epicardium and muscular substance, beneath the interventricular groove, into one of the sinuses of Valsalva. The aortic cusp of the sinus is likewise injured. The missile has subsequently produced a slit-like perforation of the free edge of the adjacent cusp, and a corresponding perforating wound of the artery itself, beyond which it was found lying between the latter and the aorta.

Lung, left (2219): A portion of the border showing a minute slit-like entry and a corresponding exit. Around each the vesicular structure is filled for a short distance with blood. From the same.

Chest-wall (2219): Showing a minute perforation in one of the intercostal spaces. From the same case.

Skin (2219): Showing a fine track accompanied with local hæmorrhage. From the same case.

Missile (2219A): The minute triangular fragment of metal which occasioned the injuries shown in the four preceding specimens: its extreme diameter is only 0·6 cm. Death took place about twenty minutes after the injury. The fragment of metal was a piece of rifle bullet fired at about 100 yards range, and doubtless broken by ricochet.

The aperture may be so small as to escape detection. Thus, No. 31 is a right lung with a perforating wound of its anterior border, followed by septic pneumo-hæmothorax. Death took place on the third day after injury. Post-mortem: Entry near right nipple. There was no trace of injury to be found in the parietal pleura. On its upper aspect the right lobe of the liver for a certain area was lacerated and necrosed. The entry and exit of the perforation through the lung measure, each, 0·5 cm. across.

Arteries.

In regard to the arteries, some of the single perforations though small in size, have not been produced by particularly minute missiles, the latter, whether shell fragments or rifle bullets, having severed only a small portion of the circumference of the vessel. The same is true of the veins, as in No. 887, which is a heart showing a minute perforation of the posterior vein of the left ventricle, near the apex. Post-mortem: Wound of right chest in posterior axillary line, about 4 in. above the costal margin; a shell fragment lay in the diaphragm, and had opened the vein on the suprajacent apex of the heart; hæmopericardium; right septic hæmothorax; perforating wound of the liver.

The following, in which the missiles are preserved, hardly come within the group of injuries caused by missiles of minimal size.

Right common carotid artery (647): Showing a jagged, unilateral wound caused by a fragment of bomb, the vessel being half divided. The missile (647A) is somewhat quadrilateral, 0·9 cm. in chief diameter.

Abdominal aorta (664): Showing a small double perforation above the renal arteries produced by a fragment of metal which was found after death in the adjacent blood-clot. One aperture is triradiate; the other irregularly oval and patulous. From a man who survived three weeks, and died from septicæmia. Post-mortem: Subperitoneal tissue infiltrated with blood-clot which extended throughout the whole extent of the posterior abdominal wall; viscera uninjured; no pus in the peritoneum. There was, in addition, an injury of the lung. Around the right kidney the subperitoneal clot was larger than elsewhere; when this organ was removed, the piece of metal was found in the clot. It was described as a somewhat cylindrical fragment, about $\frac{1}{2}$ in. by $\frac{1}{4}$ in. in diameter.

Cervical spine, &c. (538): Showing a perforation of the right vertebral artery, immediately before its entrance into the canal through the transverse process. By the side of the artery is lodged a small fragment of metal which has likewise damaged the adjacent cord of the brachial plexus. The wound healed; the later cause of death is not stated.

In other cases the missile wounding an artery is more minute. The same thing is of well-known occurrence in civil practice from gunshot or similar injuries. In the Museum of St. Thomas's Hospital there are the two following specimens:—

1690B: A short piece of a radial artery on which a small traumatic aneurysm has formed. In one of the sections there is embedded a sharp piece of steel, the penetration of the vessel by which led to the formation of the aneurysm. The muscular coat of the artery is traceable into the base of the sac, but not beyond. From a man who injured the part in stone-cutting, the injury being produced by a fragment of the instrument he was using. The wound bled profusely. It was treated by means of graduated compresses, the limb being put up on a splint. The swelling was noticed four weeks after the injury, and was excised a fortnight later.

3057A: Portion of a right radial artery with a spheroidal aneurysm about an inch in diameter which arose from it as a result of trauma. The section has been made so as to show the mouth of the sac, which is about ⅙ in. in the larger diameter. The wall of the artery is intact on the side opposite to the mouth of the aneurysm. Bristles have been placed in the vessel, which is quite pervious. From a man aged 22, who in April, 1901, was shooting with a saloon-rifle, the breach of which was imperfect. Upon firing one of the cartridges he noticed that the front of his forearm was bleeding about 2 in. above the wrist. The blood rose in a vertical stream to a height of about 2 ft. The wound was bound with pieces of rag, and the bleeding ceased. A week later, at the site of injury, a swelling the size of a Barcelona nut was observed; this slowly increased and never ceased pulsating. When the patient was first seen (June 27) there was a spherical pulsating tumour the size of a walnut, 1½ in. above the styloid process of the radius, and in the course of the radial artery. A circular scar was present on the summit of the swelling. June 30: The radial artery was tied below, and then above, the aneurysm. Whilst the tumour was being dissected out, a small foreign body, like a flake of copper, was found beneath the sac.

The two preceding specimens, in fact, surpass any in the present war collection of wounded arteries, for the minute size of the missiles producing the injury. From the Collection the only four worth citing are the following:—

Superficial femoral artery (282): A short piece successfully excised for a puncture by a grenade fragment, the small missile remaining *in situ*. The missile crosses the lumen and has ruptured the inner and middle coats of the opposite wall, but without perforating the external.

Brachial artery (380). A short piece successfully excised. The artery is doubly perforated, and nearly completely divided, the continuity being maintained between the perforations only by the external coat. The missile is a concavo-convex flake of metal, irregularly quadrilateral, and 0·5 cm. along its sides.

Popliteal artery, &c. (377): The posterior tibial artery was opened by the flake of metal separately preserved. The aperture is closed by a circumscribed thrombus. Amputation, for extensive shell wound of the calf. Death, thirty-six hours later. The vessel is divided for about one-third of its circumference. The fragment is an irregularly quadrilateral flake, 0·6 cm. where longest.

The fourth specimen, lately added by Colonel Charters Symonds, is a piece of the axillary artery occluded by a small shell fragment which is lodged within it, local thrombosis having ensued. The piece is 1·3 cm. in length, and includes the ligatured stump of a branch. On dissecting away the looser connective tissue around it no breach in the external coat is now discoverable. After dividing its wall the artery was found to be quite occluded by organized thrombus, and closely applied to a flattened fragment of shell which lay in the long axis of the vessel, and measured 0·8 cm. in length by 0·4 cm. in breadth. The piece of artery was excised from a man who was wounded January 25, 1918, in the chest and arm. It was noted at the casualty clearing station that the radial pulse was absent, and that a small foreign body lay in the line of the axillary artery. When admitted to the hospital at Netley, June, 1918, as there was some interference with the function of the ulnar nerve, the scar was explored, and a foreign body discovered lying within the axillary artery. Pulsation was present as far as its site; close below the occluded spot there arose a large branch, which was pervious, and was ligatured.

Amongst specimens of arteriovenous communication there is but one in which the missile causing the communication is preserved. Nor are such necessarily produced by minute missiles, for they may result from the passage of a rifle bullet between the vessels. In the case referred to, the missile is a small fragment of metal which lies embedded in the wall of the carotid artery close by the site of a communication with the internal jugular vein. The parts were successfully excised five weeks after the injury.

Common iliac artery and vein (634): Showing near the upper end of the vein a small double perforation produced by some minute fragment of metal; and below this a second small double perforation of the vein, and a double perforation of the adjacent artery, the two vessels intercommunicating where in apposition. There is considerable effusion of blood into the surrounding connective tissue. Cutaneous entry in buttock; exit in anterior abdominal wall. Two pieces of gut were resected. Death three days after the injury, with marked abdominal distension; no peritonitis.

Common carotid artery with internal jugular vein, showing an intercommunication without the formation of an intervening aneurysm. The aperture in the artery is an oblique slit involving nearly half its circumference, that in the vein is of about the same length.

Although it is commonly assumed that all such communications result from direct injury, one must not deny the possibility of a minute missile entering an artery at a more distant point, parallel with its axis, and afterwards being deflected so as to perforate the wall at a second spot, and enter the vein without necessarily emerging from the latter, or vice versa. In the following specimen of spinal injury something of this kind, *mutatis mutandis*, has happened :—

Portion of a spinal cord from the dorsal region, showing an oval cavity in one half, about ½ in. in length, which was produced by the lodgement of a small fragment of shell. From a soldier admitted with a small wound over the spinous process of the second dorsal vertebra. Complete paraplegia, sensation lost at costal margin ; retention of urine ; rapidly-formed bedsore. Death occurred from pneumonia. Post-mortem : A small shell fragment was found loose within the theca, opposite the body of the seventh dorsal ; the dura mater was adherent opposite the sixth dorsal vertebra, and beneath this spot was the small cavity shown, which was filled with detritus. There was no meningitis. The missile appears, therefore, to have passed downwards within the theca for some distance, and then to have been deflected so as to damage the spinal cord. (This specimen was sent to St. Thomas's early in the war by Major-General Cuthbert Wallace.)

The shifting of missiles of some magnitude within the cardio-vascular system is illustrated in two specimens in the Collection :—

Heart (253A) : From a case of penetrating wound of the thorax on the right side, and compound comminuted fracture of the right humerus. Death, ten days after injury, from ileus following shortly upon operative treatment of the fractured humerus. Post-mortem : A penetrating wound was found passing downwards, backwards, and slightly inwards to the middle line, where the inferior vena cava lies behind the liver ; the exit from the liver lay 1 in. below the entrance of the hepatic veins into the cava. Impacted in the apex of the right ventricle there is a quadrilateral fragment of shell, ¾ in. by ⅓ in. along its sides. The missile had presumably entered the right auricle from the inferior vena cava and passed thence into the ventricle.

Heart (261) : The right ventricle is laid open from behind. In its apex there is lodged a somewhat triangular fragment of shell about ¾ in. along its sides. There is no aperture of entry in the heart itself, the missile having probably entered by the superior vena cava close to the right auricle, as there was an opening in the parietal pericardium. July 20, 1915 : Shrapnel wound of the right shoulder and back over the axilla. On admission, July 25 : Pulse dicrotic, 140 ; temperature, 100·6° F. ; respiration, 32 ; subcutaneous surgical emphysema over right side of thorax; pneumothorax of the left side. July 29: Heart, first sound reduplicated and followed by a soft systolic murmur at the apex; sounds rapid but regular; no friction rub. X-ray report: Fracture of neck of right humerus; three fragments of metal near outer border of scapula; no foreign bodies in right lung, nor in the hepatic region. From the blood a streptococcus was cultivated. August 6 (seventeen days), death. Post-mortem: Fracture of third rib of right side, in anterior axillary line; right pneumothorax; right lung compressed, and its lower lobe broken down; portions of the fractured rib were found in it, but no foreign bodies. There was a wound of the pericardium on the right side over the right auricle; this was sealed with fibrin; there was no blood in the pericardial sac, and very little fluid.

In a third case (666), a shell fragment had traversed the left lobe of the liver, and perforated the apex of the left ventricle; but no missile was found. The cutaneous lesion was diagnosed as a shell wound of the chest. Death occurred two days later. The fragment here, must have escaped either into the aorta, or into the left auricle and thence into one of the pulmonary veins.

In regard to arterio-venous communications with the formation of intervening aneurysm, like simple communications these do not necessarily imply the agency of missiles of particularly small size. Among the specimens in the collection there are none in which the missile itself is preserved.

Passing by the cardiovascular system, the following are illustrations of minute perforations in other organs.

Stomach.

Stomach (618): In the case of this specimen, which comprises a piece of the chest wall, in which the sixth and seventh ribs of the right side were fractured by a rifle bullet, and the liver extensively ruptured, it is noted there was a minute puncture in the anterior wall of the stomach near the pylorus, and a small injury of the opposite wall, apparently caused by the same fragment. The rifle bullet was broken up, three pieces of it being found near the xiphoid process. Death, six hours after injury.

Bladder.

Bladder (509): Viewed from behind. Two fine pieces of white glass are placed in minute wounds of entry and exit in the right wall of the organ: the higher (that of exit) perforates the peritoneum; the lower lies near the orifice of the right ureter. The patient was accidentally wounded by a minute fragment of bomb, in the right buttock. Four hours later blood was present in the urine, but there were no signs of peritoneal involvement. Twelve hours later the urine was clear and free of blood; and remained so. On the third day signs of pelvic inflammation appeared; and the abdomen was opened. A large collection of foul blood and urine was found in the rectovesical pouch. There was one small perforation of the ileum. Death on the seventh day.

Joints.

Knee-joint (143): Perforated from the outer side of the left patella; skiagram showed a small piece of metal under the ligamentum patellæ. Injury, December 30, 1915. Death, January 19, 1916. Post-mortem: A small fragment of high explosive shell was found over the lateral border of the femur. The fragment is somewhat quadrilateral, 0·7 in. in extreme diameter. A second had perforated the pericardium and base of the left lung.

Skin.

But the most striking, perhaps, though the least important, of such minimal injuries are those of the skin produced by minute fragments of hand or rifle grenades. These have been illustrated in drawings already elsewhere published. In exposed parts like the face they may be so minute and comparatively close as to have suggested a comparison with the results of tattooing.[1] But there is one specimen in the Collection showing not only multiple wounds of the skin, but the impaction of particularly minute fragments in the subcutaneous fat and subjacent muscle.

Front of a knee-joint (248): Showing many small wounds in the skin, the least being no larger than pins' heads; caused probably by fragments of a hand or rifle grenade. In the subcutaneous fat there are shown two minute flakes of metal which have perforated the skin; and two further in the subjacent muscle, one equally minute, and another of somewhat larger size. Many similarly minute pieces were found scattered through the subcutaneous fat and muscle in other sections; one of these, on being picked away, proved to be a somewhat quadrilateral scale measuring 1·5 cm. by 0·4 cm. along its sides. On admission there was an extensive, dirty wound of the left thigh over Hunter's canal, the femoral artery being torn; the vessel was ligatured; the femoral vein was intact. The limb was amputated owing to the subsequent appearance of gangrene in the toes.

---

[1] One typical example is contained amongst the drawings deposited in the College.

Kidney and Spleen.

In the kidney and spleen the various injuries shown in the Collection so closely resemble those described in the case of the liver that it would be superfluous to detail them. With regard to the kidney: the organ may be extensively split about a perforation, considerable pieces may be detached, or a portion may be shot away from the margin with a resulting gap, accompanied with wide rending. It may be the seat of a minimal injury. It may be divided in two, as in the following specimen:—

Left kidney (349): Almost completely divided across the middle, the renal pelvis being unruptured. Entry of bullet in ninth left intercostal space behind the left mid-axillary line; its track lay through the left pleural cavity, not involving the lung; through the posterior margin of the spleen; across the middle of the left kidney and the front of the spinal canal, piercing the theca about the level of the first lumbar vertebra. Exit on right side of lumbar region; the bullet was found. Hæmoperitoneum, and slight peritonitis on left side of abdomen; much perirenal hæmorrhage; retroperitoneal tissue suppurating on the left side. The wound of the spleen was closed by fibrinous clot. The first lumbar vertebra was fractured, a fragment being driven into the cauda equina.

A form of gunshot injury not apparently represented in the liver is shown in one specimen—viz., fissure from indirect or transmitted violence, the missile passing in the vicinity only of the organ.

Kidney (619): Showing superficial horizontal fissuring on both aspects, about the middle. On bisection it is clear that the fissures on the front and back are not continuous around the free border, nor through the substance of the organ. There were multiple wounds in the back from shell fragments; death occurred the same day. One fragment entered the posterior edge of the right iliac crest, cut across the back of the sacrum, and lodged in the left iliac crest. Another entered the right flank higher up, below the twelfth rib, divided the external oblique muscle, but without perforating the quadratus lumborum or the peritoneum; and finally perforated the lower lumbar vertebræ, injuring the cauda equina. The fissures cannot be attributed to grazing even, for the surface is otherwise quite intact. And they must be put down to sudden and violent displacement caused by the passage of the missile in the immediate vicinity of the back of the kidney. The fissures resemble such as may arise in civil practice from pressure upon the front of the abdomen; and it may be observed, with respect to these, that they, too, may be found on both aspects of the organ.

In the Museum of St. Thomas's Hospital there is the left kidney (2055) of a man who was struck by an engine and thrown against a rail, death occurring from collapse. There are many horizontal fissures involving the anterior border of the hilum; and four its posterior, the longest, as measured from the edge of the fold, being 1·5 cm.

In military, as in civil practice, contusions in the loin caused by objects of magnitude, as might be anticipated, may be accompanied with rupture of the kidney, as is illustrated in the following:—

Kidney (2553): Showing a series of deep fissures, somewhat radial in direction, which spread from the upper border of the hilum and involve the lower part of the upper half of the organ: there is one fissure on the opposite aspect. As indicated by their opacity and whiteness, certain areas of the renal tissue about the site of damage, and elsewhere, have undergone necrosis. From a man who was struck in the left loin by the nose-cap of a shell, on December 3, 1917; hæmaturia followed, December 19. There was a large bruise over the left lower ribs, without fracture; tender swelling in the left loin; pain and frequency of micturition. The kidney was excised; there was an extensive effusion of blood around it.

CONTUSION WITHOUT BREACH OF SURFACE.

In the case of certain organs grazing may result in contusion and local hæmorrhage without breach of surface. This is to be observed in the lung, the stomach, and intestine, as illustrated in the Collection. Such a lesion is to be explained partly by their extreme mobility, and partly by the compressibility of the air or gas which they contain.

Lung, left (372): The lower lobe is solidified from hæmorrhage following contusion. The missile, a shell fragment, entered through a lacerated wound over the eighth and ninth ribs of the left side, in the posterior axillary line, grooved the front of the body of the eleventh dorsal vertebra, and wounded the right pleura over the ninth intercostal space in the mid-axillary line; the fragment lay beneath the skin over the latter wound. The lower lobe of the left lung was contused but not wounded. In its course the shell fragment had torn a rent 2 in. long in the left half of the diaphragm, ruptured the spleen and upper pole of the left kidney, passed across the mediastinum without injuring the aorta or œsophagus, torn two rents in the right side of the diaphragm, one near the spinal column, the other opposite the wound in the right pleura; thence the missile had perforated the right lobe of the liver from below upwards; the right lung and right kidney were uninjured.

In one case the lung is contused without penetration of the pleural cavity.

Lung, left (1006): A vertical section showing hæmorrhagic consolidation of the upper two-thirds of the lower lobe, and of the adjacent portion of the upper, without perforation or laceration of the organ. There was a small cutaneous entry in the superior third of the left upper arm, which communicated directly with a wound of the back at the level of the angle of the scapula; the bullet after fracturing the humerus had travelled up the medullary cavity through the head of the bone, across the shoulder-joint, and comminuted the axillary border of the scapula before escaping. Death occurred from shock. No penetration of the thorax was discovered at the autopsy. The *right* lung was normal, as was also the heart.

One matter of importance attaching to contusions of the stomach and intestine is that the damage may lead to necrosis and perforation, as illustrated by the following four specimens in the collection:—

Stomach (467): The cardiac end, showing a small perforation due to ulceration following gunshot contusion; the mucosa is distinctly everted through the aperture. There was a septic shell wound of the left side of the thorax, towards the lower end of the mid-axillary line; and slight laceration of the inferior surface of the lower lobe of the left lung: the shell fragment was found lying between the inner surface of the spleen (which was wounded) and the stomach. Some slight extravasation of the gastric contents had taken place, but there was no peritoneal infection.

As a second example, but one in which perforation did not ensue, the following may be adduced:—

Stomach (473): Unilateral perforation by shell fragment, which remained within its cavity. The rent in the anterior wall was closed by suture; below this there was a separate contusion, which was invaginated with a purse-string suture. There were no gastric symptoms. Death, thirty-six days later from general peritonitis and right-sided empyema. Post-mortem: There was a healing ulcer at the site of the contusion; a second ulcer in connexion with the rent had almost perforated, and from it a silk suture hung, almost free, into the cavity of the stomach.

(553): Perforation and tears of the ileum, produced by bullet; sloughing of 6 in. of the transverse colon distended with fæces, and only contused. Death occurred the day after operation.

And there is one carefully observed case in which the small gut was contused at a spot where the abdominal wall was obliquely perforated without the peritoneum being opened—i.e., the peritoneum intervened between the missile and the surface of the subjacent intestine. In this specimen (455) the wall of the small intestine is blood-stained for about 3·5 cm. ($1\frac{3}{5}$ in.). On abdominal exploration no sign of intestinal perforation was discovered. Death took place from peritonitis on the third day after exploration. Post-mortem: A small, secondary perforation was found in the plum-coloured, contused piece of gut; the cæcum was also bruised. There was no wound of the peritoneum.

Such contusions of the intestine if caused by missiles at high speed are doubtless followed, like other injuries, by motor inhibition and subsequent stasis, the exalted virulence of the intestinal bacteria so induced, leading to a necrosing inflammation of the damaged structure, which terminates in perforation.

THE ABSENCE OF EXPLOSIVE EFFECT IN THE LUNG.

The single exception in regard to the explosive effect produced in perforating injuries of solid viscera, is furnished by the lung. The damage is here limited to the immediate vicinity of the track, the alveoli for varying distances around becoming filled with blood. This absence of transmitted damage is explained by the fact that the medium traversed is more gaseous than solid, the contained air being not only compressible but in free communication through the trachea, with the exterior; to this may be added the resilience of the tissue arising from the large amount of elastic fibre in the alveolar walls. The extravasation of blood which takes place during life about the damaged pulmonary tissue makes it difficult to study the track of the injury. In the following experiment, the upper lobe of the isolated normal lung from a male, aged 56, was fixed over an aperture in the front of a long box filled with cotton waste, and shot through with a service rifle and pointed bullet at a distance of 20 ft.; the organ was first lightly inflated and ligatured. The apertures of entry and exit were exactly equal in size; each, as inspected immediately afterwards, being a circular hole, without any surrounding fissuring, and no larger in diameter than the bullet. The lung was afterwards hardened, and bisected across the middle of the patulous tunnel. The closest inspection failed to disclose any fissuring around the latter: the aperture in the section exactly admitted the bullet.

Amongst the specimens in the collection corresponding with this result, the best is the following:—

Lungs (321): Showing a transverse perforation of the lower lobe of each; none of the four apertures exceed the diameter of the bullet, and there is an almost complete absence of fissuring around them; some extravasation of blood has occurred into the alveoli at the seats of injury. The bullet entered through the right rib, 3 in. from the spinal column, perforating the lower lobe of the right lung, then the spinal column itself, the lower lobe of the left lung, and finally resting in the subcutaneous tissue of the eighth left intercostal space, 3½ in. from the spine, at which spot it was extracted. Death, twelve hours after injury. Three pints of blood were found in the right pleura, and one pint in the left.

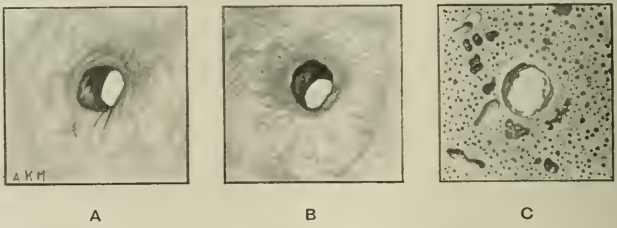


Fig. 10.

Lung, perforated after removal from the body: showing (**A**) the entry, and (**B**) the exit of a perforation made with a service rifle and pointed bullet at a distance of 20 ft. The lung was lightly inflated and secured in front of a slit in a long box filled with cotton waste. The apertures are of equal size and no larger than the diameter of the bullet. (**C**) A section across the tunnel, midway between the entry and exit. There is no trace of fissuring around either entry or exit, nor around the tunnel itself. Natural size.

Figurae explicatio.

Pulmonis lobus superior perforatus postquam a corpore ablatus fuerat, missili celerrime movente. Monstrantur (**A**) introitus, (**B**) exitus, uterque vix major quam missile perforans. (**C**) Pulmo eadem transverse persecta. Absunt fissurae circum aut aperturam utramque aut canalem per viscus terebratam.

It is noteworthy here that the track through the lung first perforated is no larger than that through its fellow which was perforated after the bullet had passed through the spinal column, and suffered a reduction in speed.

Œsophagus and right lung, &c. (1045): Showing a bilateral perforating wound of the left common carotid artery, a bilateral perforation of the œsophagus, and perforation of the apex of the right lung. The internal and middle coats of the artery in the bridge connecting its two perforations anteriorly, have been torn across. The several apertures are of small size, though there is a short gutter in connexion with the entry in the lung: the bullet passed from left to right. The patient was shot accidentally at close range, death occurring a few hours afterwards. Post-mortem: Cutaneous entry, above the left sternoclavicular articulation; exit, internally to the vertebral border of the right scapula, 2 in. above its lower angle: the right pleura was full of blood, and the lung collapsed.

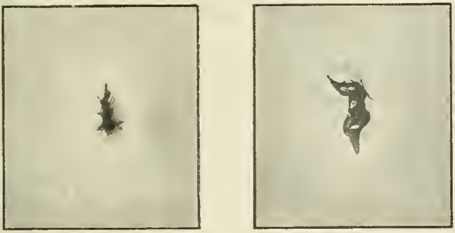


FIG. 11.

Lung: showing (A) the entry of a perforating track in the right lung, caused by a bullet which afterwards passed through the spinal column, and thence through the left lung; the exit in the latter is shown in (B). There is scarcely any fissuring around either aperture, each of which is just large enough to allow of the passage of the missile.

Figurae explicatio.

(A) Pulmonis dextrae lobus inferior. Introitus monstratur canalis per viscus perforatae missili quod deinde columnam vertebralem, denique pulmonem sinistram pertransivit. (B) Exitus in pulmone sinistrâ. In utrâque pulmone apertura vix major quam missile est; circum aperturas fissurae absunt.

In the following case the contrast between the pulmonary and hepatic lesions produced by the same missile is well shown:—

Lung (626): Showing a perforation of the thin margin of one lobe of the right lung, and bruising of the apposed border of the other lobe. The entry and exit are simple slits, each about 0·7 cm. in length.

The right lobe of the liver shows an extensive stellate aperture of entry on the lower aspect, that on the upper being smaller; there is a clean perforation in the suprajacent portion of the diaphragm. The missile, a fair-sized piece of lead (probably from a bullet first broken by ricochet), after perforating the right lung, was found impacted in the sixth rib. Entrance, in the right flank just above the iliac crest; in its course the missile perforated the pelvis of the right kidney. The patient lived two days.

When the track of a bullet is wider, as in the following specimen, it must be attributed to the missile having perforated the lung side on.

Lung, right (495): Showing a perforation of the lower lobe from below upwards, of a size above what is usually due to the passage of an undamaged bullet. Death, shortly after admission. Cutaneous entry, between fourth and fifth lumbar spines; the missile passing thence through an intervertebral foramen; then between the vessels of the right kidney and through its upper pole; the right lobe of the liver, diaphragm, lower lobe of right lung, and finally through the fourth and fifth ribs. The rifle bullet was found, undamaged, in the anterior border of the right scapula.

Here the unusual size must be attributed to the bullet having turned in its course so as to strike side on. There is no fissuring of the pulmonary tissue around either aperture, each of which is a slit 3 cm. in length. The shorter form of German bullet measures 2·8 cm. in its chief axis.

If this absence of explosive effect is true of bullets at high speed, it is naturally so of missiles moving less rapidly, like shrapnel bullets.

(60): Injury of both lungs, produced by an undamaged (spherical) shrapnel bullet, which passed across the chest and likewise perforated the œsophagus. In the right lung the damage is limited to notching of the thin lower, posterior border. In the left lung (that first struck) the lower lobe is cleanly perforated, the perforation presenting a small aperture of entry and another of exit; there is no further damage, or extremely little, around. Death twelve hours after injury. Entry from the left, through the seventh intercostal space; eighth rib fractured. There was a tear in the inferior vena cava at its entrance into the chest; a piece of clothing was found near the rent, as though it had partly plugged the latter. The shrapnel bullet was taken from the right pleural cavity.

Lungs (319): Both perforated by a shrapnel bullet which traversed the upper and lower lobes of the left lung, then passed through the seventh and eighth dorsal vertebræ, and thence through the lower lobe of the right lung. The bullet was found in the subcutaneous tissue over the ninth right intercostal space. The several apertures in the lungs are of the diameter of the bullet, and are unaccompanied with surrounding fissuring. The patient was admitted collapsed and dyspnœic; death occurred eighteen hours after injury.

In the case of the lung, again, gutter wounds are unattended with the explosive fissuring witnessed, say, in the liver.

(165): The base of a right lung showing a perforation of each margin, and a long gutter wound of the flat area between them, without accompanying fissure; produced by bullet. The surface of the organ is covered with blood-clot. Admitted January 11, 1916, expectorating arterial blood; cutaneous entry, ½ in. to the outer side of right nipple; exit, 2 in. from the mid-line on the right side, about the level of the eighth rib. Death, January 14. The diaphragm was split and the liver grazed on the upper aspect.

There is a curious and apparent exception to the statement that explosive phenomena are wanting in the case of the lung, but it is one which proves the rule. It is a lung (261) in the lower lobe of which there is a deep gutter wound, the floor of which is coarsely nodulated and coated with blood-clot. Death occurred five days afterwards. The cutaneous entry and exit wounds were but 3 in. apart, and lay in the axis of the fifth rib. And it is remarked in the notes accompanying the specimen that the small size of the wounds in the skin made the amount of injury found in the lung unexpected. A section of the organ subsequently made shows a generalized patchy and nodular fibrosis (pneumonoconiosis), and this partial solidification may be taken as the explanation of the unusual extent of the damage.

In the lung, in fact, the injury caused by less rapidly moving shell fragments may exceed that by bullets, the missile cutting out a track, somewhat as it does in the liver.

Lung (40): A slice from a right lung, showing a somewhat irregular horizontal tunnel, lined with blood-clot, through the lower lobe, caused by a shell fragment. The alveoli in the vicinity are filled with blood; the organ is collapsed. The patient died with symptoms of secondary internal hæmorrhage. Post-mortem: Cutaneous entry on the right side, low down, in the posterior axillary line; the eighth rib was fractured about 3 in. from its posterior extremity; right hæmothorax, and partial pulmonary collapse; bilateral perforation of the right lung, with gaping entry and exit. After perforating the right lung the shell fragment passed through the body of the ninth dorsal vertebra, and thence into the left lung, beneath the pleura of which it lay, after a side-to-side perforation: the left pleura contained 3½ pints of partly clotted blood. The various other viscera were uninjured.

That the missile may remain within the lung is illustrated in several specimens (Nos. 40, 104, 110, 120, 262). It is noteworthy that in all, the missile is a fragment of shell—i.e., a slowly moving projectile brought to rest by so unresisting a tissue as that of the lung.

And finally, the fact that fragments of fractured rib or clavicle may be driven with the missile into the lung, it goes without saying, is illustrated in the Collection. The best example of this is the following:—

Lung: Showing a somewhat deep, slightly irregular fissure 4 in. in length, passing transversely through the apex of the upper lobe, followed by considerable hæmorrhage into the alveoli. At the inner end of the lesion, that of exit, there lies a considerable fragment of rib, sufficiently large and sharp to account largely for the incised wound shown.

In yet other cases, the lung is superficially damaged by the simple displacement of the fragments of a broken rib.

Lung (599): Showing a superficial injury produced by a fragment of rib projecting within the thorax. In the apex there is, moreover, a gutter wound in which there lies a piece of clothing.

Chest wall; left side (134): Showing a fracture of two adjacent ribs, with a corresponding laceration of the pleura, the former being caused by a bullet which entered on the left side of the vertebral column, and passed upwards, fracturing certain vertebræ on the left side, and two of the ribs. Death, from cardiac failure, associated with collapse of lung and hæmorrhage.

HOLLOW ORGANS.

Whether or not a disruptive effect will take place in a hollow organ, assuming the missile to be at high speed, depends upon the nature of its contents. Some hollow organs, like the pharynx, larynx and trachea, are normally open and filled with air; some are normally in a closed, i.e., strictly empty, condition, like the œsophagus; some contain fluid and gaseous contents, like the stomach and intestine; others, fluid only, like the gall-bladder, the urinary bladder, and cardio-vascular system. The Collection contains examples of injuries in all these organs. In doubly perforating wounds of the pharynx, larynx, and trachea, the apertures of entry and of exit are, as might be anticipated, small and of equal size. The absence of disruptive effect in the case of these organs is, it is hardly necessary to observe, due to the compressibility of the air contained within them, and its free communication with the exterior. In regard to their *walls*, these are of insufficient mass, i.e., too thin to allow of the production of such an effect upon them: the wall is simply perforated like the diaphragm, or the skin, or the peritoneum.

Larynx.

Larynx (414): Showing the track of a bullet through the crico-thyroid membrane to the right of the mid-line, across the cavity of the larynx; and below the lower border of the cricoid cartilage, across the œsophagus; the bullet was found after death lodged in the body of the fifth cervical vertebra. Wounded through the neck. Death from suppurative infection of the deeper retropharyngeal tissues extending into the mediastinum. The several apertures are simple rents about 0·6 cm. in length: the œsophagus, like the larynx, is bilaterally perforated.

Larynx (472): Showing a bullet track passing from the left side through the base of the aryepiglottic fold, and thence through the right wall of the pharynx, beyond which it passed to the spine. The spinal cord was injured, septic meningitis supervening. Tracheotomy has been performed. The two perforations shown are quite small and have evidently only just allowed of the passage of the bullet.

Concerning the perforations of the larynx by shrapnel, if caused by small fragments they present no peculiar features: if by larger, the thyroid cartilage may be extensively comminuted as well as perforated (Nos. 2409, 2410).

Trachea.

There is one example of double perforation of the trachea produced by bullet, viz.:—

Trachea (448): Bullet wound of upper end of trachea, showing the aperture in the anterior wall: the missile after a second perforation injured the apex of the right lung. Hæmothorax, infected with *Bacillus aërogenes*. The aperture of entry in the anterior wall is slightly oblique, but not larger than the bullet.

A second example of tracheal wound was produced by a shell fragment; the perforation is unilateral, the missile having come to a standstill.

Trachea and lungs (2255): Showing a shell fragment 1½ in. in length which has entered the lower end of the trachea from the left side, portion of the missile lying across the right bronchus. The track has first passed almost horizontally through the upper lobe of the left lung. Death occurred about two hours after the injury, which was caused by a bomb fragment from an enemy aeroplane. Post-mortem: Large entry over the left scapula; left hæmothorax; the left phrenic nerve is damaged.

Œsophagus.

Perforated as it is in the empty condition, the injury is of the simplest kind, the entry and exit being of equal size and both of them small.

In the following specimen the double perforation was caused by a rifle bullet at close range.

(1045): Showing a doubly perforating wound of the left common carotid artery, a bilateral perforation of the œsophagus and of the apex of the right lung. The several apertures are of small size. The patient was shot accidentally at close range, death occurring a few hours later. Post-mortem: Cutaneous entry, above the left sterno-clavicular articulation; exit, internally to the vertebral border of the right scapula, 2 in. above its lower angle: the right pleura was full of blood, and the lung collapsed.

A second example of double perforation of the œsophagus by bullet is associated with a double perforation of the larynx; the missile lodged in the body of the fifth cervical vertebra. The apertures in the upper end of the œsophagus are simple rents about 0·6 cm. in length. (Specimen 414, already cited under Larynx.)

In the following, a bilateral perforation was caused by a less rapidly moving shrapnel bullet:—

(60): Bilateral perforation of the œsophagus below the bifurcation of the trachea; each aperture is small and well defined. The injury was produced by an intact shrapnel bullet which passed across the chest, injuring both lungs. Death occurred twelve hours afterwards. The spherical shrapnel bullet was found after death, in the right pleural cavity; entry, through the left seventh intercostal space, the eighth rib being fractured.

Stomach.

The double perforation by rifle bullet, here commonly takes the form of a small entry and exit, without explosive phenomena. Such simple perforations imply that the organ is struck either in an empty condition or if filled partly with ingesta and partly with air swallowed during deglutition or with gas, that the perforation has occurred through the latter compressible media. In the resting condition, although the viscus is a closed almost vertical tube, there is normally a small collection of gas or air in its highest part, the great cul-de-sac or fundus, above the level of the cardia; if the bullet traverse this, the entry and exit will be as limited as in the strictly empty area. When the organ is filled partly with a fluid or semisolid, and partly with a gaseous medium, the case is altered. If the perforation takes place through the fluid, a disruptive result will ensue in spite of the presence of a buffer of compressible gas elsewhere, as may be proved by direct experiment. Whilst digestion is proceeding normally, there appears to be little air or gas in the stomach, any excess being discharged by eructation. In a cat which had had a full meal of tinned salmon, when the stomach was examined *in situ* on opening the abdomen four hours afterwards, it was found still fairly distended with food; on compression of the contents from the pylorus upwards, about 1 c.c. of gas was found in the greater fundus.

Spleen and stomach (444): Showing results of a bullet wound at close range. The perforation of the spleen is accompanied with extensive radial fissuring on both the convex and concave aspects. The entry in the posterior wall of the stomach, which lies midway between the lesser and greater curvatures, and almost midway between the cardia and pylorus, just admits a pencil; the exit, near the middle of the lesser curvature, is very slightly larger. Neither is complicated with any splitting around. There is no eversion of the mucosa. Death, fourteen hours after injury. Cutaneous entry, in mid-axillary line: track from ninth rib to the sixth and seventh costo-sternal junctions. The left lobe of the liver beyond the small circular exit in the stomach was likewise extensively ruptured.

The specimen shows by contrast the explosive effect produced upon the adjacent spleen by the action of the same bullet.

Stomach (25): Showing a double perforation, the two apertures being small and of equal size: one lies in the anterior wall about an inch above the middle of the greater curvature; the other, in the posterior wall, is so situate that in the natural vertical position of the organ it would lie in the greater fundus, occupied in the empty state by the gas bubble. The mucosa is not everted through either opening.

Stomach (639): Showing two small stellate perforations; one in the anterior, the other in the posterior wall, somewhat nearer to the pyloric than to the cardiac end. There is no eversion of the mucosa. Below it there is mounted a piece of the transverse colon in which there is a double perforation sufficiently large to admit the little finger, and through which the mucosa is slightly everted. The liver and kidney were likewise injured. Death on admission. Cutaneous entry, through left costal arch; exit, in left flank. The gut is almost empty and contracted.

Stomach (256): Showing a double perforation due to gunshot; both apertures, small. Mucosa of that in the greater curvature, pouting: the second aperture lies in the lower border of the pyloric canal. Death twelve hours after injury. Early peritonitis; no hæmoperitoneum. The liver was likewise injured. Cutaneous apertures, one at the eighth left costo-chondral junction, the other in the ninth interspace.

Stomach (454): Showing a small double perforation close by the cardiac orifice. With the organ in the vertical position, the entry lies below, the exit above, the orifice, in the position occupied by the gas bubble in the empty viscus. Cutaneous entry, in the epigastrium; liver, likewise wounded. Death the day following exploration. Bullet found in the thorax. The mucosa was seen to be contused along the course of the missile, and from it there hung a few half-detached shreds.

Where the perforation is single and of marked extent, as in the following specimen, it may be explained by the wall having been struck parallel with its surface; or to magnify the damage under the same circumstances, the bullet may have struck the wall side on. In addition to this, however, a true explosive effect will ensue should the viscus contain fluid or ingesta in bulk; and this, in spite of the presence of air or gas, should the perforation take place through the fluid medium; certainly, if the perforation is double; and very probably if it is only single.

Stomach (278): Showing a large gaping slit involving the lower two-thirds of the anterior wall and reaching to the greater curvature: the margin is in places everted. The injury was caused by a bullet which entered near the right nipple, lacerated the liver, stomach, and colon, and after having fractured the great trochanter of the left femur, lodged beneath the skin. Death, eight hours later.

The most extensive injury in the Collection is one produced by two machine-gun bullets at close range—"a few yards."

Stomach (112): Showing two irregular gaps, one in the middle of the anterior, and one in the middle of the posterior wall, each as large almost as the palm of the hand. The injury was accidentally produced by two machine-gun bullets at a few yards' range.

The closeness of the range might suggest that the damage resulted from the direct action of the gas of explosion. That the *skin* at close range is not affected by this factor need not be insisted upon. The following experiment will show how remarkably resistent this structure is. A piece of skin (from a dissecting body) which had at no time been allowed to dry, was tightly stretched on a wooden frame 7½ in. square, and secured with gimp nails closely and regularly driven in: the frame was firmly nailed in front of an aperture in a long box of cotton waste. It was then shot through with a pointed bullet and service rifle at a measured distance of 1 ft. from the muzzle. All that resulted was a clean circular hole of the exact diameter of the bullet, without any trace whatever of splitting around. It is worth noticing that in this skin there was a small perforation cut unintentionally with the scalpel during dissection: it lay 3·5 cm. (1⅗ in.) from the bullet hole; yet it was not in the least enlarged by the explosion.

In the case under consideration the damage cannot be ascribed to the effect of explosion gas, since the "few yards" range would amply suffice to exclude this factor; nor to the fragmentation of ribs, seeing that the gaps in the anterior and posterior wall lie exactly one in front of the other, in the area uncovered by the costal arches. On exposing the stomach by turning back the abdominal wall in the ordinary post-mortem procedure, and marking out the triangular area so exposed between the costal arches, I found that the area involved in the gunshot injury exactly corresponded with it. The disruptive action of the two missiles, had the organ been empty, or had it contained only gas, would have been *nil*; the supplementary action of fractured ribs is excluded by the position of the lesion. By this process it may be inferred that the stomach was filled with water or semi-solid food, and that the injury is explosive in character.

The following experiment will elucidate what has been under consideration. The stomach of a healthy young woman, who was killed in an accident, was emptied, washed out with chloroform emulsion, and kept in cold storage for four days before use. It was then filled for about one-third with water, and, above this, was inflated with air; both ends being ligatured the organ was tied to a frame of wood in the vertical position, with the pyloric end upwards; and was shot through with a service rifle and pointed bullet at a distance of 20 ft. The bullet was fired exactly through the middle of the water. On inspection the damage was found confined to the lower part; in this there was one irregular rent 5 in. long through the anterior wall; and two others of equal length in the posterior: they ran in a parallel direction corresponding with the longer axis of the organ. The condition shown in the actual specimen of gunshot disruption cited, was, thus, almost exactly reproduced in the experiment.

The injuries caused by shell fragments are not of sufficient interest to need reference.

Small Intestine.

Gunshot injuries of the intestine range themselves into contusions, grazes, single and double perforations, complete and incomplete divisions, and more extensive lacerations.

Contusion.—The best example of this in the Collection is (295): Portion of jejunum from a case of bullet wound of the abdomen, showing a somewhat widespread hæmorrhage into its wall from a contusion unaccompanied with any breach of surface. Death, nine hours after injury. Post-mortem: Abdomen full of blood; the cæcum and pelvic colon were lacerated; the ileum was completely divided in three places; and there were two rents in the mesentery.

A case of necrosis arising secondarily to contusion will be referred to presently (No. 553) under "Complete division."

Grazing, after contusion, is the next of the simpler injuries of the intestine, and is illustrated in a specimen comprising 2 ft. of the small intestine which were successfully excised. It shows multiple lesions, accompanied with local ecchymosis, and comprises two single perforations; one almost complete division; and in addition, an area of ecchymosis where the peritoneum has been abraded without perforation.

In one of the shooting experiments carried out upon lengths of intestine filled with water, a similar graze was intentionally produced, without perforation: the peritoneum at the stricken spot presented a gap about the size of a threepenny-piece, the muscular wall being intact. The tissue had not been made rigid by the previous use of any fixative.

Double Perforation.—Double perforation may take place across the axis of the intestine, or in the direction of its length, the two apertures in the latter case being in close proximity. As an example of the first:—

Small intestine (610): Showing an almost complete transverse division caused by rifle bullet, with laceration of the adjoining mesentery, and a second double perforation. Each aperture of the latter is small, circular, and of no greater diameter than the bullet, which passed through the rectum and emerged posteriorly through the sacrum; hæmoperitoneum.

Of double perforation in the length of the intestine the following is typical:—

Small intestine (341): Double perforation by shrapnel bullet, in the long axis, the two apertures being in close proximity; the bullet was found after death in the omentum. Death, from generalized peritonitis, five days after injury.

Double perforations of the small intestine, like those of the stomach, are unattended with rending, even when produced by bullets at high speed, should the perforation take place, that is, in the empty condition, or should the bullet traverse gaseous as distinguished from fluid or semi-fluid contents.

Complete Division.—That bullets in an undamaged condition will produce complete division, or even more extensive injuries, is proved by the co-existence of such lesions with simple double perforations. The specimen of transverse division accompanied with double perforation just cited (610) is a proof; of which the following are confirmations:—

Small intestine (105): A long piece taken after death, showing multiple injuries produced by an undamaged bullet. In some situations the intestine is almost, and in others completely, severed across its long axis; in yet others, extensive longitudinal gaps have resulted from the passage of the missile through the wall in a longitudinal direction. The bowel is in a contracted, almost empty, condition.

Small intestine (553): A piece of ileum, 4 ft. in length, which was resected five hours after injury. Cutaneous entry, in right buttock; exit, near umbilicus. At the operation (five hours after injury) the abdomen was found full of blood; an end-to-end union was made after the resection; death the same day. The lesions (eleven in number) comprise unilateral perforations, almost complete divisions, and longitudinal rents; the intestine is nearly empty, and contracted. Six inches of the transverse colon, which was loaded with fæces and bruised, were found to have sloughed.

Variations in the types of injuries produced by bullets upon an empty intestinal track are attributable to the missile having pierced the wall of the bowel in the oblique or long axis of the latter instead of transversely, or to its having turned on its side during its passage through the abdomen. An empty condition of the bowel, by reducing its diameter, renders its transverse division more easily brought about. Besides the variations due to these causes, proper disruptive or explosive effects are to be encountered. The following experiments will indicate their character. That perforation of the intestine where occupied only with gaseous contents is unaccompanied with rending is easily demonstrated.

(1) A length of small intestine was inflated, tied up, and vertically fixed in a wooden frame by securing its two ends. It was perforated exactly in the middle line with a service rifle and pointed bullet, at a distance of 20 ft. The entry and exit were circular holes just admitting the bullet, without any surrounding fissure. A similar experiment made upon an inflated urinary bladder yielded a like result. It may be stated that in these and all similar experiments, the viscera used were washed out with chloroform emulsion, and kept in cold storage for a few days before the observation was made. By this means the unnatural rigidity of tissue produced by formol or alcohol was obviated.

(2) A length of the same intestine was filled with water, tied up as before, and shot through the middle line. A full disruptive result ensued.

(3) A length of the same, including portion of the duodenum, was partly filled with water, and above this, inflated, tied up, and shot through the middle of the lowest portion holding the water only. As in the case of the stomach shot through under similar conditions, a marked disruption occurred in the part which contained the fluid ; in this there were two irregular slits, each about 10 cm. (4 in.) in length.

(4) A length of the same intestine was filled with water, tied up, and steadied as before. It was shot at so as just to strike the side, a string having been tied vertically almost in contact with it to serve as a guide. A widely gaping rent, 3 in. in length, with irregular margins resulted, the intact ends of the intestine being connected by a long somewhat narrow bridge comprising all the coats of the bowel. This experiment was carried out twice with almost identical results.

The foregoing observations explain the production of the disruptive effects met with at times in the human intestine, and which are attributable to the rapidly moving missile having struck a loop of bowel filled with fluid or semifluid contents; if a unilateral perforation, there will be a single rent; if a double, two or possibly three. The presence of gas in a neighbouring piece would not prevent such a result.

Although caused by a fragment of shell, nevertheless the magnitude and irregularity of the two openings in the following specimen, force one to regard the result as explosive, for the size of the missile is small (1 cm. in chief diameter), and its arrest against the spine is compatible with its having been at a high velocity.

Small intestine (601): A loop of the upper jejunum showing a particularly extensive injury consisting of two double perforations which lie about 30 cm. (12 in.) apart. In the case of one of these double injuries the apertures are separated by a narrow bridge of tissue; one aperture is 2½ in. in length and involves the free border; the other aperture involves the attached border behind the preceding and is about 1 in. in length. Of the second double perforation one of the apertures is large and gaping, with a somewhat sinuous edge, 2¼ in. by 1¼ in. in diameter: the other aperture in the opposite wall is a hemi-division starting from the attached border. In its present condition the bowel is particularly voluminous. There was an entry in the posterior abdominal wall, internal to the descending colon, admitting two fingers, and passing through the psoas muscle just externally to the left iliac artery, and thence to the spine. In the skin at the site of entry there was a sutured longitudinal operation wound, some inches in length, provided with a gauze drain. Hæmoperitoneum; and free gas in the cavity. Death was due to hæmorrhage and shock; no operation being indicated. The shell fragment which produced the injury is an irregular, flattened, somewhat quadrilateral piece 1 cm. (⅜ in.) in chief diameter, which lay against the spine.

Needless to say, some of the most extensive damage to the small intestine is occasioned by shell fragments, by reason of their size, irregular form, and oscillation; although, of course, single or double perforations may be produced by those of lesser magnitude. Of the latter, No. 299 is an excellent example: Two pieces of small intestine excised for multiple perforations due to a shell fragment, showing, in one, two irregular double perforations large enough to admit the middle finger; and in the other, a double perforation of either the anterior or posterior wall, the apertures being side by side in close proximity, and each involving half of the circumference of the bowel. Death, from shock, thirty-six hours after the operation.

One unusual form of single perforation by shell fragment is shown in No. 219: A portion of small intestine injured by a fragment of shell which afterwards lodged in the bladder. The lesion takes the form of a U-shaped flap in the free border, its axis lying across the longer axis of the bowel; marked eversion of the mucosa. The piece of intestine was successfully excised, and the wall of the bladder sutured.

From the specimens of intestinal injuries produced by shell may be cited:—

(1159): Six feet of small intestine. Successfully excised for wounds, twenty in number, of which some are complete, some incomplete divisions, and others double perforations. The bowel is empty and contracted.

(68): A piece of small intestine showing a hemitransverse division, and a double perforation, the two apertures of which are larger than those produced by the direct action of a bullet. The shell fragment is flat, of elongated quadrilateral form, 1·5 cm. in chief diameter.

Three portions of small intestine removed after death, showing injuries due to shell, the condition of the patient not allowing of operation: one piece is almost divided; a second piece is divided at one spot and half so at another. In the third there are two very irregular and extensive lacerations accompanied with loss of substance, the interior of the bowel being widely exposed. In connexion with some of the injuries the mesentery is involved.

In military literature, as is well known, a few cases have been recorded in which a missile has lodged within the intestine, or has secondarily reached it, and been afterwards voided. In the Collection there is at present only one such example:—

A piece of small intestine (36), the mesenteric border of which is perforated by a flattened fragment of lead which lies in the lumen; the slit in the wall is about 1 cm. in length, and the missile of corresponding size.

From sources antedating the present War there are two in the College Museum:—

(968): A sacrum showing a gunshot fracture of the third and fourth segments. Profuse suppuration ensued; the bullet was passed by the rectum five months later. Death, nineteen months afterwards. There was no paraplegia; but incontinence of urine and fæces.—From the Peninsular Campaign, 1808-14.

(2435A): A round bullet, deformed, taken after death from the interior of the intestine many years after it had lodged in the abdomen.

Death was due to internal strangulation indirectly caused by the foreign body.—From the Indian Mutiny, 1857-59.

One curious specimen, recently added to the Collection, may be cited in passing: A lesser omentum, into the cavity of which a shrapnel bullet had penetrated. From its edge there hangs a cord of fibrous tissue 9 cm. (3½ in.) long, in the lowest, free end of which there is encysted an intact shrapnel bullet. The formation of the cord has evidently resulted from the long-continued traction made by the bullet upon the delicate membrane of the lesser omentum. The whole of the lesser omentum, with the bullet, was removed during an operation for a large omental hernia. Six attempts for the removal of the missile had been made in India and Mesopotamia.

And there is a second (2665) almost identical, in which the cord is but 2·5 cm. (1 in.) in length, and where its mode of formation is clear from the fact that it contains small lobules of fat, and superiorly expands into the rest of the omentum.

And, lastly, amongst things curious, there is a Meckel's diverticulum which has been doubly perforated by gunshot: Portion of ileum, with a Meckel's diverticulum about ¾ in. in length, the free end of which is somewhat bulbous and bilobed. The enlarged end has been cleanly perforated, the apertures of entry and exit being small and circular, and evidently made by a bullet. The ileum, rectum, and bladder were likewise injured; 3½ ft. of the ileum, including the diverticulum, were successfully resected.

Rectum and Colon.

In regard to the rectum and colon, some degree of disruptive effect might be anticipated, were the bowel filled with consistent fæces unadmixed with gas, where struck. Of the specimens of perforated rectum in the Collection, two were produced by shell fragments at low speed, the apertures being of no marked size; two, by bullets, may be viewed as disruptive.

Rectum (612): Showing the track of an injury passing through its upper part, from above. There are two small apertures of entry side by side, and an inch below these are two others; beyond this the bowel is again perforated into the subperitoneal fat, the peritoneum of Douglas's pouch being intact. Death a few hours after admission. There was a small cutaneous entry 2 in. below, and to the right of the umbilicus; several loops of small intestine were injured. No cutaneous exit was seen, and no missile was found. The missiles were evidently multiple and of small dimensions.

Rectum and bladder (644): Showing an oblique double perforation of the rectum due to a shell fragment: the posterior aperture, that of entry, is so oblique as to be valvular. The perforations admit the little finger. Cutaneous entry, in the right buttock; missile, found close to exit wound in the rectum. Cystitis ensued, although the recto-vesical pouch was not injured: the bladder was drained suprapubically. The shell fragment is flattened, somewhat quadrilateral, and 2 cm. in longer diameter.

Rectum and bladder (617): Showing an oval aperture 4 cm. (1½ in.) in length, in the left wall of the rectum, and which lay opposite the second segment of the sacrum, and was caused by a rifle bullet. Behind the gaping aperture, the wall of the bowel is cleanly torn for an equal distance so as to form a semicircular flap. The bladder is uninjured. Post-mortem: Small cutaneous entry, about 1½ in. above and behind the great trochanter; much retroperitoneal bleeding in pelvis, and along pelvic colon; the superior hæmorrhoidal artery was found divided. The second segment of the sacrum was grooved by the bullet, which kept a retroperitoneal course, and passed eventually through the right obturator foramen to lodge under the gluteus medius muscle. The bullet was intact.

Rectum (610): Showing a double perforation. The apertures, which are oval and about 4 cm. (1½ in.) in length, were caused by a bullet. Post-mortem: Small, round cutaneous entry over right rectus abdominis; a similar exit over the sacrum, which was perforated. Abdomen, full of blood-clot. There were six lacerations of the small intestine, in two of which the bowel was completely severed; the mesentery was also lacerated.

In this case, seeing that the cutaneous entry and exit were both small, and that the velocity of the bullet carried it completely through the body, in spite of its having emerged through the sacrum, the injury may be classed as disruptive in kind.

There are further specimens amongst those of injury to the colon, in which the damage was caused by bullet, and which present features similar to the latter two.

Ascending colon (544), in which there are two large holes, one close above the other, caused by a bullet which was found in the abdomen in an intact condition. The apertures are separated by a horizontal bridge ½ in. in breadth; they are about equal in size, and each nearly half divides the bowel, which, it may be observed, is not in an empty contracted condition; the higher aperture measures about 5 cm. (1¾ in.) horizontally to the gut.

Pelvic colon (369) : Showing extensive laceration by a bullet which entered by the left buttock. Death twenty-four hours later from shock. The bowel is divided for about three-fourths of its circumference, the aperture being roughly cruciform, and where most extensive—i.e., in its longest measurement—1½ in. The intestine was found bespattered with fæces.

Colon, &c. (295) : Four pieces of intestine taken after death, showing a rent in the pelvic colon, a rent in the cæcum, complete division of the ileum in three places, contusion of the jejunum, and two rents in the mesentery. Admitted collapsed, with bullet wound of the abdomen. Death nine hours afterwards. Abdomen found full of blood.

When pieces of the large or small intestine are filled with modelling clay softened with water, short of being diffluent, and shot through at 20 ft., the amount of damage far exceeds that shown in any of the specimens. Two portions of normal colon (washed out with chloroform emulsion and kept in cold storage) were filled with the clay, air being quite excluded, tied up and shot exactly through the middle with a service rifle at 20 ft. In each piece there were produced three rents, each 5 in. in length. Two pieces of small intestine were similarly filled, tied up, and secured to a wooden frame, and shot through the centre. The result was alike in both. In each, about 3 in. were shot away, the ends being connected only by a cord-like strip of the wall. Each end was split into somewhat triangular segments like the calyx of a fuchsia.

The Motor Inhibition of the Intestine following Injury.

Gunshot injuries of the intestine are followed by a reflex inhibition of movement, not simply in the immediate vicinity of the several lesions but of the whole canal. It need hardly be said, perhaps, that the actual phenomenon in question, apart from its explanation, did not escape the observation of Hunter, as appears from his comments upon a case of gunshot injury to the small intestine, the preparation from which is contained in the College Museum. The specimen (No. 2,434) is a piece of small intestine showing multiple perforations produced by pistol shot in a duel. Death occurred within twenty-four hours. The injury was followed by frequent vomiting and abdominal tension ; but, in spite of the use of two enemata, the patient had no stool. After death no extravasation of the intestinal contents was found, and delicate adhesions had already formed about the wounds, between the apposed surfaces of the peritoneum. He asks: "What could be the cause of his having no stool even from the clysters? Were the intestines inclined to be quiet under such circumstances?"[1] That a successful issue *may* come of such perforations, even under present conditions, the following observation by Colonel Thomas Sinclair will prove. A man was shot through the abdomen, and recovered without any operation. Some months later he was shot a second time through the abdomen, and died. At the autopsy eight healed intestinal perforations were discovered, and a patent traumatic entero-enterostomy.

A similar inhibition is to be observed after other forms of intestinal injury. Mr. D'Arcy Power has the following case in the St. Bartholomew's Hospital Reports (xxxvi, p. 41): A boy was admitted whose abdomen had been run over by an omnibus, the left side of the pelvis being fractured. When first seen his abdomen was tender, but he slept well and did not appear collapsed. After a second good night the abdomen was still tender, and was becoming rigid, and a little more distended. The distension increased during the day, and at 6 p.m. the abdomen no longer moved on respiration. On exploration the small intestine was found ruptured in the right iliac fossa, and the peritoneum acutely inflamed. The injured piece was excised.

Evidence in the same direction is furnished by the results of surgical operations upon the intestine. In the first stage of a left inguinal colotomy for rectal obstruction, after the loop of colon is brought out and secured in the wound, there is, in some cases at least, a cessation in the forward movement of the intestinal contents for twenty-four hours, or even for three or four days. On the bowel being incised, the new injury is succeeded by a second period of quiescence. Such a sequence, however, is not constant. Amongst other things, the inhibition of movement will be proportionate to the stimulus; the injury produced by a bullet at high speed will be more effective and regular in its result than that of a carefully conducted operation carried out upon the intestine.

An analytical study of the movements of the small intestine reveals four kinds: Three of these are observable upon the exposed bowel;[2] the fourth was discovered by means of skiagraphy after a bismuth meal.[3] They comprise: (1) A local rhythmic pulsation (the so-called

---

[1] Hunter, "On the Blood," &c.: Works, iii, pp. 561-4.

[2] W. M. Bayliss and E. H. Starling, "Movements and Innervation of the Small Intestine," *Journ. of Phys.*, 1899, xxiv, p 99.

[3] W. B. Cannon, "The Movements of the Intestines studied by means of the Rontgen Rays," *Amer. Journ. of Phys.*, 1902, vi, p. 251.

pendulum movements of German authors) of purely myogenic source, and unaccompanied with peristalsis; (2) local peristaltic waves of short length, occurring only in a forward direction, and starting at various spots; (3) the "rhythmic segmentation" of Cannon, whereby one of the long narrow masses of the food is suddenly divided by orderly transverse contraction into many small segments of nearly equal size, these segments being again suddenly subdivided, whilst the neighbouring halves reunite to produce a new series. (4) The grand or major peristaltic wave, as it might be called, which obliterates all else in its course and extends for long distances, although not starting in all cases at the same spot. This wave, unlike the other movements, is controlled by the central nervous system; the vagus being the motor nerve, and the splanchnic the inhibitory which relaxes the muscular wall immediately in advance of the oncoming wave. In the production of the minor peristalsis the same two elements concur—inhibition pursued by contraction; but here the mechanism is co-ordinated from a lower centre. The rhythmic segmentation of Cannon was not observed by Bayliss and Starling, doubtless because the action of the gut was induced by the latter observers by means of a bolus of cotton-wool and soap. The segmentation is obviously purposive, and is incited, it may be assumed, by the presence only of utilizable contents, the stimulus of the movement being, one may suppose, not simply physical but chemical.

The action of an injury inflicted upon the small intestine is to produce a general inhibition of intestinal movement. The efferent inhibitory impulse is conveyed by the splanchnic nerves from a higher centre than those which control the lesser movements of the bowel, the action of which centres is completely over-ridden by the first. That this is so may be visibly demonstrated by such an experiment as the following, which was recently carried out by Professor Bayliss and myself. August 20, 1918: About 9 a.m. a cat was allowed a full meal of tinned salmon, the intestinal canal having been cleared the day before with castor oil. After an hour or so the animal was etherized, and subsequently kept under the anæsthetic through a tracheotomy tube, after the method of Cannon. The abdomen was opened in the mid-line for a distance of about 3 in., and the walls withdrawn without disturbing the omentum, through which the small intestine is easily seen; the divided walls were kept apart by the insertion of an oval piece of glass fitted in a frame. At 12.45, by which time peristalsis was actively proceeding, a coil of small intestine was exposed by withdrawing the abdominal wall from one side of the frame, and with a blunt-pointed stout pair of scissors it was suddenly half divided at the free border, in two places, and at once returned. The peristalsis, which had been till then proceeding in the coils beneath the glass, immediately ceased. A sketch was made of the intestine under observation; an hour and a half later no change had taken place in its position, and all movement was still in abeyance. The animal was now killed by letting air into the chest; the small intestine was removed and placed in warm salt solution. Active peristalsis at once re-commenced—the inhibitory action of the splanchnics had been annulled by their section.

Urinary Bladder.

When we come to the urinary bladder, the physical conditions are less variable, for it is either empty, or filled with a highly mobile and incompressible medium; and this is contained in a confined or closed cavity. My own experiments carried out upon the normal human bladder distended with water demonstrate that a well-pronounced disruptive effect ensues when the organ is shot through at a range of 20 ft., with a service rifle and pointed bullet. The bladders before use were washed out with chloroform water and kept in cold storage without the employment of any fixative. In distending them with water every trace of air was vigorously excluded; they were then ligatured and suspended from the prostate in front of the longitudinal slit in a long box of cotton waste: below, they were secured by two strings from the peritoneum near the apex, tied divergently upon the front of the box below. One of the bladders was filled but not tensely so: the entry was a clean aperture only slightly larger than the bullet; the exit, a longitudinal rent 6 cm. in length. The second bladder from a well-developed man, aged 45, who died of apoplexy, was tensely filled with water. As in the previous case, the entry was an aperture but slightly larger in diameter than the bullet: the opposite wall presented three longitudinal rents; the middle 4 cm. in length, each of the lateral 5 cm. A third bladder was inflated as a control: this yielded two small apertures of entry and exit, exactly equal in size to the circumference of the bullet, and without any accompanying rending. Similar effects were obtained by firing through ox-bladders at a distance of 20 ft., suspended from a gallows supported below upon a base of wet cotton wool. In the most pronounced result, the entry just admitted the passage of the bullet, the longitudinal rent in the opposite wall being 12·5 cm. (5 in.). This result is of the simplest hydrodynamic kind, and depends upon the mobility and the incompressibility of the medium traversed, which is driven forwards so as to rend the distal aperture as soon as the point of the bullet penetrates the distal wall; or possibly before, since the wave rate *in water* would be above 4,100 ft. per second, whilst the highest muzzle velocity of the bullet *in air* is 2,440 ft.[1]

As shown by the specimens in the Collection, however, this distal rupture is rare in any pronounced degree. If doubly perforated in the empty state, no such effect would, of course, ensue. Double perforation of the bladder without, or with but little explosive result, is illustrated in the following specimen:—

Bladder (679): Showing a double perforation by rifle bullet. Both apertures involve the peritoneum. The entry lies in the upper part of the left lateral wall, and is of about the diameter of a pencil; the exit, in the posterior wall to the right of the mid-line, is a horizontal slit 1 in. in length. The patient was admitted, and operated upon, for a bullet wound of the abdomen; portion of the intestine was resected. Death occurred two days later from general peritonitis.

There is, however, one excellent example of explosive result in the Collection. The missile, a rifle bullet, entered by the buttock, perforated the rectum, and then the bladder, emerging above the pubes. In the posterior wall of the bladder there is a fairly clean hole; the anterior wall is longitudinally rent from top to bottom.

The magnitude of such a result will depend upon the amount of fluid in—i.e., the tension of—the viscus.

Bladder and rectum (645): Showing a perforation of the floor of the recto-vesical pouch, and of the bladder, from behind forwards. The entry in the posterior wall of the bladder is large enough to admit the finger; the anterior wall is irregularly rent from its apex almost to its base. As seen at the upper part of the specimen, the pelvic colon is almost torn across, this portion of the bowel having occupied the pouch at the time of the injury. Cutaneous entry, in the right gluteal region; exit, to the left of the symphysis pubis, with the left testicle presenting in it. After emerging from the bladder, the bullet shattered the pubic bone to the left of the symphysis. The left spermatic cord had been caught by the missile, and had drawn up the left testicle into the wound of exit.

---

[1] The velocity of sound in air at 20° C. is about 1,130 ft. per second; in water, at the same temperature, it is about 4,100 ft. per second.

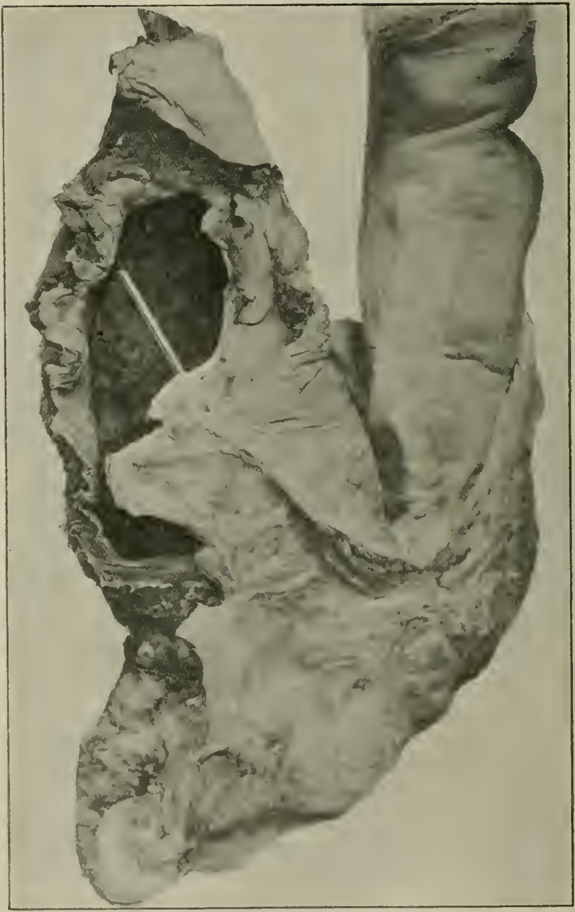


Fig. 12.

Bladder perforated from behind without fracture of bone. The aperture of entry in the posterior wall (not shown) is small; that of exit is a long vertical rent reaching almost from apex to base. The viscus was doubtless distended with urine when perforated. From a photograph, slightly reduced.

Figurae explicatio.

Vesica urinaria a tergo perforata sine ossis fracturâ, effectum monstrans dirumpentem. Apertura introitûs in pariete posteriori, parva; illa exitûs in pariete anteriori fissurâ longâ repraesentatur. Viscus probabiliter tum urinâ perdistensum quum perforatum est. Pictura photographica; paulum deminuta.

That no disruptive result will ensue if the velocity of the missile, whether rifle bullet or shell fragment, is low, goes without saying. Thus there is in the collection of water-colour drawings from the seat of war, one showing a bullet lying within the bladder, as viewed with the cystoscope. The drawing was made on the thirteenth day after injury, and shows the undamaged bullet free in the base of the bladder. The missile was extracted through a small suprapubic opening, with complete success. It had entered through the right buttock, and produced six perforations of the small intestine, which with that in the bladder were successfully sutured.

In passing, it will be enough to mention (what is so well known) that missiles which come to rest within the bladder may form the nuclei of phosphatic calculi. In connexion with the Crimean War [1854-56], many such cases were recorded.

Up to the present date (July, 1918) but one has been received from the present war. The specimen in question is an oval calculus 3·8 cm. ($1\frac{1}{2}$ in.) in chief diameter, consisting of compactly laminated phosphate, formed upon a piece of metal which was introduced in connexion with a gunshot injury of the lower part of the front of the abdomen. It was successfully removed by suprapubic cystotomy. The metallic nature of the nucleus was evident in the skiagram taken during life. Although compact in structure and 3·8 cm. in longer diameter, the calculus had formed within eight weeks.

Renal Pelvis.

There is one instance of perforation confined practically to the renal pelvis (626). In this specimen there are three ragged, parallel and vertical slits produced by an irregular fragment of lead; the injury is accompanied with a slight loss of substance, and horizontal fissuring of the anterior lip of the hilum and adjoining renal substance. Cutaneous entry, in the right flank just above the crest of the ilium; the missile after perforating the renal pelvis pierced the liver and diaphragm, bruised the right lung, and finally became impacted in the sixth rib. The patient lived two days. The piece of lead is of fair size, and is possibly part of the core of a bullet broken by ricochet.

In this case the lesion may be disruptive in character; the triple rupture is not easy to account for on other grounds, although the amount of fluid normally present in the pelvis is comparatively small.

Gall-bladder.

Of the lesser hollow viscera, there is one example of perforation of the gall-bladder.

Liver (1046): Showing an irregular, comminuted rent, 2½ in. in length, involving the anterior portion of the right lobe, at right angles to its free anterior border, over, and parallel with the gall-bladder. In the left wall of the gall-bladder there are two gaping rents separated by a narrow bridge, which cross the long axis and involve about half its circumference. Admitted moribund on September 22, 1916; death the following day. External wound, over right costal margin outside nipple, no exit. Post-mortem: There was a large lacerated opening in the line of the lesser curvature of the stomach, commencing 2½ in. from the pylorus; the organ was contracted and contained a fragment of metal of fair size.

The lodgement of the missile in the stomach proves its low velocity, and does not allow of the damage being explosive. The size of the two apertures is best explained by the oblique transit of the fragment, for they are separated only by a narrow bridge of tissue. The laceration in the line of the lesser curvature points to the same conclusion.

To take up, lastly, the cardio-vascular system:—

Heart.

Of the examples of gunshot injuries of this organ in the Collection, none furnish any evidence of a disruptive effect, notwithstanding that such a result might be anticipated were the auricle or ventricle doubly perforated during diastole, by a bullet at high speed. It must not be concluded from the evidence forthcoming that no such phenomenon occurs; death would be immediate, and such cases would not come under the ordinary examination whereby material is obtained. The perforations, in fact, in the Collection are limited to injuries produced by slowly moving fragments of shell which have entered the heart without emerging from it, and were not immediately fatal. In No. 571, a shell fragment has perforated the left wall of the left ventricle, and after guttering the posterior wall of the cavity, has pierced the septum obliquely in such a way as to lie exposed, but embedded, in the posterior wall of the right ventricle. There is a considerable amount of blood extravasated into the pericardial fat. This is the nearest approach to a double perforation of any of the cardiac chambers.

Heart (19): From the right ventricle a bullet was extracted during life. Three sutures in the posterior wall mark the site of its removal; near the edge of the reflected pericardium is a longer, sutured incision made in the operation, which was carried out under a local anæsthetic. The patient survived four days (Colonel H. M. W. Gray, *British Medical Journal*, 1915).

Other preparations illustrate superficial injuries or grazes, and in others the missile is infixed at different depths in the myocardium. Of superficial injuries the following may be cited:—

Heart (663): Showing a small perforation by bomb fragment of the front of the pericardium, and a horizontal non-perforating wound of the interventricular septum, 1·5 cm. in length, which was sutured, portions of the fourth and fifth ribs and the cartilages being removed to give access to the parts. Death twenty-four hours after the injury. The aperture in the pericardium led into the left pleura, the escape of blood from the pericardial sac having led to left hæmothorax. The patient was admitted with signs of continued internal hæmorrhage.

Heart (267): Showing an irregular rent 1¼ in. long in the parietal pericardium, due to a shell fragment, which likewise produced a superficial linear wound in the wall of the right ventricle immediately beneath. There is an extensive extravasation of blood in the subpericardial and mediastinal connective tissue. The patient lived three days. Post-mortem: A shell fragment was found protruding from the back of the sternum. There was a large amount of blood-stained effusion in the right pleura.

Of instances where the missile is embedded in the muscular substance without perforation, the following are typical:—

Heart (470): Showing a quadrilateral shell fragment, 0·6 cm. along its sides, embedded in the posterior surface of the left ventricle near the interventricular groove. Post-mortem: Cutaneous entry, small, almost healed; ninth rib notched about 6 in. from its posterior end. Right hæmothorax; suppurative pericarditis.

Heart (474): Showing a slit in the pericardium due to a shell fragment, the size of a haricot, which lies in the substance of the wall of the left ventricle without having opened its cavity. Admitted three days after injury. A wound over the sternum was found to communicate with the exterior mediastinum; streptococcal injection of right knee-joint from a second injury. Death on the sixth day. There was thin purulent fluid in the pericardial sac.

Heart (142): Showing a quadrilateral fragment of shell of the same size as that in No. 470, lying in a suppurating space in the posterior surface of the right ventricle; the abscess was confined by adhesions; general pericarditis. Small wound in the left eighth intercostal space, an inch behind mid-axillary line; septic hæmothorax.

One specimen is a rupture apparently due to contusion (657).

Heart (657): Showing a vertical perforation 1·3 cm. in length, in the anterior wall of the left ventricle; the aperture within the ventricle is plugged with one end of a flattened, well-defined blood-clot.

Post-mortem: Grazing shell lesion of skin (without breach) in left mid-axillary line, accompanied with comminuted fracture of the fourth and fifth ribs in the same region; left lung torn. No wound was discovered in the pericardium, and no missile in the clot within the ventricle. The injury of the left ventricle appears, therefore, to have been a rupture due to contusion.

The two most extensive injuries are the following:—

(1) Heart (453): Showing damage produced by an armour-piercing bullet (used against aeroplane). There is a broad, gutter-like wound 2½ in. in length, attended with considerable loss of substance, and involving the apices of both ventricles, the cavities of which are opened.

(2) Heart (2,530): Both the ventricles and both the auricles have been widely opened, the muscular substance being torn into shreds; with the exception of the aorta, which is connected to the rest of the organ only by a few processes of fibrous tissue, the great vessels have been completely detached. The patient, a gunner, was struck, whilst sitting on his limber, by a large fragment of a shell which burst a few yards away. The missile struck the centre of the chest, traversed the sternum and thorax, and emerged posteriorly after comminuting the spine.

Arteries.

Of incomplete perforation of arteries, or rupture of the inner and middle coats without that of the external, there are three, if not four examples in the Collection.

(257): Left common iliac artery showing a transverse rupture of the inner and middle coats about ¼ in. in length, without perforation of the external; in the recent state there was an adherent layer of blood-clot within the vessel at the site of injury. There is a second equally small horizontal rupture of the inner and middle tunics about 1½ in. higher up, in the posterior wall of the aorta, in connexion with the mouth of one of the lumbar branches. At each spot there is a small limited extravasation of blood externally.

The second example is likewise an iliac artery, showing a transverse rupture of the inner and middle coats, involving more than half the circumference. In the intact outer coat there is a local extravasation of blood over the deeper injury. It was caused by the passage of a bullet immediately over the artery.

Aorta (1433): Portion of the thoracic aorta, showing a small subdivided thrombus about 0·7 cm. in diameter across its base. Emerging from beneath the clot there are a few short fissures in the intima. From a case of gunshot fracture of the dorsal spine, and perforation of the left lung. The lesion in the aorta lay immediately adjacent to the track of the bullet.

The occurrence of such a result from direct contusion is, needless to say, well recognized in civil practice. And it can be readily imitated after death by sharply striking an artery crosswise upon a resisting surface: on slitting up the vessel the inner and middle coats will be found circularly ruptured, the external remaining intact.

In a fourth specimen, the popliteal vein has been severed by gunshot. The artery is contused and thrombosed, probably after rupture of its inner and middle coats. There was no arterial hæmorrhage or arterial hæmatoma. Amputation was performed, as the foot and leg had become cold and insensible.

One need not attribute this incomplete rupture from gunshot, to a hydrodynamic cause—to the sudden displacement of the blood within the vessel. The localized extravasation in the outer coat over the rupture of the deeper, proves that the lesions correspond in position: were the result hydrodynamic, the rupture of the deeper tunics would take place on the wall opposite to that struck.

Aorta.

That the aorta may be doubly perforated without explosive rupture is proved by a specimen in the Collection. In this case, however, not only is the missile a particularly small fragment of metal, but that it was travelling at low speed is shown by the fact that it lay close by the exit beyond the vessel.

The specimen (664) shows a small double perforation close above the renal arteries, caused by a fragment of metal 1·4 cm. by 0·6 cm. ($\frac{1}{2}$ in. by $\frac{1}{4}$ in.) which was found after death in the adjacent blood-clot. One operation is triradiate, the other, irregularly oval and patulous. It came from a man who was wounded on May 1, 1916, and survived three weeks. Some moderate hæmoptysis occurred early in the history. When seen, May 6, there were two nearly healed wounds, one in the left axilla, and the other just behind the vertebral border of the left scapula. May 17: He began to vomit, and complained of generalized abdominal pain. Abdominal exploration was negative. Death took place on May 23. Post-mortem: The left pleural cavity contained about half a pint of blood. There was some injury to the sixth left rib, and perforation of the diaphragm. Abdomen: No blood or pus in the peritoneal cavity; subperitoneal tissue, infiltrated with blood-clot which extended beneath the peritoneum throughout the posterior abdominal wall; viscera uninjured; cause of death, septicæmia.

Arteries.

Of doubly perforating wounds of arteries, one of the cleanest examples is the following, in which a bullet has accurately perforated both the external and internal carotids close above their origin, the perforation of each vessel being double.

Left common carotid (642): Showing a double perforation, by bullet, of each of its two divisions, close above their origin. The four apertures were rendered quite circular by the insertion of a glass rod after death, and are now of the diameter of the bullet: that in the external carotid lies immediately above the origin of the inferior thyroid. The vertical section made of the internal displays an occluding thrombus above and below the injury, and portion of a clot protruding through the perforation. The lumen of the external carotid is likewise occluded by thrombus both above and below the perforation, the clot extending into the inferior thyroid. There was no bleeding from the external wound. Death, five days later. Post-mortem: Thrombosis of the left middle cerebral artery, followed by necrotic softening of the left cerebral hemisphere.

An equally good example is the following (1045): Left common carotid artery bilaterally perforated, together with the œsophagus and apex of the right lung. The several apertures in the different structures are of small size. The patient was accidentally shot at close range, death occurring a few hours later. Post-mortem: Cutaneous entry, above the left sterno-clavicular articulation; exit, internally to the vertebral border of the right scapula, 2 in. above its lower angle; the right pleura was full of blood, and the lung was collapsed. A close examination of the artery shows that although the perforation is double, the internal and middle tunics are transversely ruptured in the anterior bridge of the vessel (0·3 cm. in breadth) between the apertures, which lie considerably nearer to one another in front than behind. On slitting up the common carotid through the posterior wall, a non-adherent thrombus, 1 cm. in length, was found filling the vessel above the perforation. As viewed from within after removal of the clot, there is no rupture of the inner and middle tunics between the apertures behind: nor anywhere in the whole length of the artery [3 cm.] preserved above. The perforations, I found, just allowed of the passage of a bullet across the vessel.

In another case the popliteal artery (1089) is doubly perforated by gunshot, and shows two aneurysmal sacs projecting from opposite sides of the vessel, a rod of glass being passed from one sac into the other across its lumen. In connexion with the pulsating swelling, pain was referred down the leg, from pressure upon the internal and external popliteal nerves. Injury received August, 1916: the portion of the artery involved was excised together with a piece of the popliteal vein (which was uninjured) in March, 1917, with successful result.

In regard to single or unilateral perforation of arteries, it may be observed that there is no transmitted damage, as a hydrodynamic effect, here any more than in double perforation. The examination *ad hoc* of the interior of a common carotid, doubly perforated by bullet at close range, has been already referred to. And to select a typical one of single perforation by bullet, received in trench warfare—i.e., at short range—there is in the Museum of St. Thomas's Hospital a portion of a femoral artery with a corresponding length of the vein (Spec. No. 1696A) which were successfully excised. In the artery there is a well defined, almost circular, aperture involving nearly half its circumference; the perforation was connected with a false aneurysm. From a private, aged 20, wounded in the European War (1914) at Neuve Chapelle, March 10, 1915, by a bullet which passed through the lower third of the thigh. There was nothing abnormal about the cutaneous entry or exit. March 17: There was a pulsating hæmatoma beneath the aperture of entry; and œdema of the foot. Some arterial hæmorrhage occurred on March 19. An incision was made over the lower part of Hunter's canal, when it was found that the bullet had passed between the artery and the vein, in which latter there was a ragged opening. The damaged parts of both vessels were excised with a successful result. In cutting open the artery with a scalpel, through the intact side, and brushing out remnants of clot, no trace of transmitted injury was discernible in the intima or the media, either from within, or in the divided edges. The length of vessel removed in the excision measures 1·5 cm. above, and the same distance below, the perforation.

Veins.

Vena cava.—In gunshot injuries of the vena cava, whether single or double perforations, a disruptive result might have been expected, if produced by rifle bullets. Yet none of the specimens in the Collection show any such.

In the first of three specimens, No. 204, the inferior vena cava is bilaterally perforated by a bullet which injured the colon and third part of the duodenum. Death occurred without obvious cause, thirty hours later. Post-mortem: Moderate retroperitoneal hæmorrhage; the apex of the bullet was impacted in the body of the fourth lumbar vertebra. Of the apertures, one is circular, 1·5 cm. in diameter: the other, oval and oblique, 2 cm. in its longer axis; they are separated by a narrow bridge of the wall of the vessel.

In the second of the three (373) there is a double perforation by bullet, in the anterior wall of the inferior vena cava about an inch above its bifurcation. The apertures, which are somewhat circular, are equal in size, and measure each 0·7 cm. in diameter; they are separated only by a narrow longitudinal strip of the wall of the vessel. Death occurred five hours after admission. There was a laceration of the upper jejunum. The peritoneum contained between two and three pints of blood which had escaped from the vena cava. No injury to the solid viscera was found.

In the third specimen (668), there is a double, antero-posterior perforation of the inferior vena cava between the renal veins. The apertures are of equal size, and take the form of horizontal, slightly gaping slits, each about 1 cm. in length. Death occurred four hours after admission. Post-mortem: The peritoneum contained two pints of fluid blood; there was in addition some laceration of the liver. The injury is called a bullet wound in the note which accompanied the specimen.

In none of these three specimens are the apertures sufficiently extensive to be classed as disruptive.

In the case of more slowly moving missiles, naturally no more extensive effect would ensue.

Inferior vena cava (205): Bilaterally perforated at its lower end by a shrapnel bullet which entered the body near the right posterior superior iliac spine, and lodged at the umbilicus. The patient arrived dead. The perforations are two oval slits, their longer axis corresponding with that of the vessel, each 1·3 cm. in length; the narrower longitudinal bridge between them is 1 cm. in breadth. Post-mortem: There were two and a half pints of blood in the peritoneal cavity; the root of the mesentery was torn; there was no injury to the intestine.

Inferior vena cava (271): Bilaterally perforated, showing two somewhat circular holes produced by a small shell fragment which was found lying on it, and which had first wounded the ascending colon, and the third part of the duodenum. Death from septicæmia twelve hours after suture of the colon. The apertures are large enough to admit a pencil. The shell fragment is somewhat pyramidal, 1·3 cm. in longer diameter.

Other Veins than the Cava.

Of double perforation of veins of lesser calibre than the cavæ there are not a few examples in the Collection.

A dissection of the side of the neck, showing perforation of the base of the epiglottis and of the right lobe of the thyroid gland; the bullet has afterwards divided the anterior wall of the common carotid artery, passed through the vagus nerve and doubly perforated the internal jugular vein. The patient was seen three days after injury: general swelling of neck; no pulsatile tumour; auscultation disclosed an arterio-venous murmur at the posterior border of the sternomastoid muscle. Death, on tenth day from sudden hæmorrhage into the air passages.

Common iliac vein (203): Showing a double perforation by bullet; the apertures are oval, equal, and of about the diameter of the bullet. There was in addition a small single perforation of the right common iliac artery. Death six hours later. The bullet entered at the posterior part of the right iliac crest, and escaped at the left costal arch near the anterior end of the eighth rib. Abdomen, full of blood; small intestine, perforated.

Common iliac artery and vein, left (634): Showing, near the upper end of the vein, a small double perforation produced by some minute fragment of metal; below this there is a second, small double perforation of the vein, and a double perforation of the adjacent artery, the two vessels intercommunicating where in apposition. There is considerable effusion of blood into the surrounding connective tissue. Cutaneous entry, in buttock; exit, in anterior abdominal wall. Two pieces of gut were resected. Death occurred three days after the injury, with marked distension of the abdomen; there was no peritonitis.

External iliac vein, left (648): Showing a double perforation by shrapnel bullet. The apertures are of equal size, almost circular, and about the diameter of a pencil, one being slightly higher than the other. Immediately above the injury there is an oval clot 3·5 cm. in length, which was not sufficiently large to occlude the vessel, and was lightly adherent. Death, thirty-six hours after injury. Cutaneous entry in right buttock. The track of injury passed through the iliac bone, the small intestine (in which were seven perforations), the pelvic colon, meso-rectum, the parietal peritoneum below the pelvic brim on the left side, and thence below Poupart's ligament, where the missile was found in a slightly damaged condition. There was only slight retroperitoneal and intraperitoneal bleeding.

Popliteal artery and vein: The artery is half divided; the vein, doubly perforated at the same level. The holes in the vein are circular, and of the diameter of a bullet. There was a large clot at the site of the injury, but no murmur. Gangrene of the leg ensued, and amputation was successfully carried out.

The specimens of unilateral or single perforation of veins are none of sufficient interest to need citing.

In reflecting upon the absence of explosive effect, whether in double or single perforations of the arteries and veins, three things suggest themselves:—

(1) The small volume of fluid concerned. The outside diameter of the adult aorta near its division, as taken under a pressure of 240 mm. of mercury is 1·7 cm., according to Ballance and Edmunds.[1] In a measurement made after filling a segment of the adult aorta (male) with cotton wool, and soaking it in water, I found the outside diameter immediately below the renal arteries, to be 1·7 cm., and above those 2 cm. The outside diameter of the inferior vena cava from the same autopsy, I found to be: Below the renal veins, 2·5 cm.; and above them, 3 cm.: the vessel being tied up and fully distended with water.

The length of the British bullet is 3·4 cm.; of the German, 2·7 cm.; of the French, 4 cm. In a doubly perforating wound of the aorta below the renal arteries (1·7 cm. diameter), after the complete crossing of the lumen by the German bullet, there would remain 1 cm. of the latter not yet within the vessel. In the case of the inferior vena cava below the renal veins (2·5 cm. diameter) a length of 0·2 cm. would still lie outside. Such a state of things is hardly favourable to the production of a wave of fluid against the opposite wall, and this would, of course, be still less so, in double perforation of smaller vessels.

---

[1] "Ligation in Continuity," p. 55.

(2) There is the indefinite continuity of the fluid at the stricken spot with that in the rest of the arteries and veins, which would permit of its ready displacement.

(3) The astonishing resistence of a normal artery under extreme distension, must be, lastly, taken into account: and the same is true of the veins.

The external iliac arteries were removed from a woman, aged 24. Each was tied up at one end and a cannula fixed in at the other, the syringe for injection being that used for the dissection-bodies in the anatomical department at St. Thomas's. The vessel was then distended with water with all the force a strong man could exert, the barrel of the syringe being held in both hands and drawn towards the piston, the cross piece at the end of the rod of which was placed against an immovable surface. The artery became quite incompressible to the fingers, and as hard as though solid. It was then slit up, and pinned out: the usual transverse ridging of the intima was well pronounced, but no fissures were discernible with a hand lens. The material was afterwards fixed in dilute alcohol, and microscopic sections cut in the longitudinal direction: they revealed no lesions whatever, either in the intima or in the muscular coat.

Testicle.

There is one specimen of slightly oblique postero-anterior perforation of this organ (608). The entry, on the posterior aspect, is small and circular; from the exit there protrudes a hernia of the tubular substance, about the size of a walnut. Death, three hours after admission. Post-mortem: Multiple wounds, one of which through the flank, was associated with injury of the colon and duodenum. The testicle was injured by a second missile. The result here may be viewed as, in a minor degree, disruptive; the soft, incompressible substance being driven forward so as to produce a larger rent in the tough, inelastic sac of the tunica albuginea.

Globe of the Eye.

Of explosive effects occurring in the globe from gunshot, some examples have been recorded by Colonel W. T. Lister (*Lancet*, July 20, 1918). Rupture of the sclerotic or cornea may result from the transit of rapidly moving missiles through the orbit, the rupture taking place opposite the line of impact. When the foreign body perforates the back of the globe, the cornea may be driven forwards, and the contents ejected. When a sufficiently large fragment enters the eye in front the sclerotic may be split radially into processes extending backwards from the site of entry.

Central Nervous System.

The effects of high explosives upon the central nervous system have been dealt with by Lieut.-Col. F. W. Mott (Lettsomian Lectures, 1916). The author remarks that when large quantities of high explosives are detonated, an enormous aërial compression is generated, and it is quite possible that this may be transmitted to the incompressible fluid about the base of the brain, and cause shock to the vital centres of the floor of the fourth ventricle, causing instantaneous arrest of the functions of the cardiac and respiratory centres. "A sudden shock of great intensity would be transmitted through this incompressible fluid, and seeing that it not merely surrounds the central nervous system, but fills up the ventricles and central canal, and all the interstices of the tissues, serving as it does the function of lymph, it follows that a shock communicated to the fluid of sufficient intensity would make itself felt on all the neurons." Although, as Leonard Hill says (loc. cit.), "in the case of a high velocity bullet striking the spine, it seems possible that the cerebro-spinal fluid beneath the struck part may be instantly compressed, and act as a solid body, transmitting the blow to the cord," there are no specimens in the Collection in which such a result is demonstrable. In none can the damage inflicted by fragments of the neural arches upon the spinal cord be eliminated from any such simple dynamic action of the bullet upon the cerebro-spinal fluid.

Addendum.—In regard to double perforations of viscera containing fluid, it may be observed that, although the disruptive effect in some cases takes the form of a rent in the remote wall alone (bladder), in others (stomach and intestine) both apertures are of this kind. These apparent discrepancies may be ascribed to the differences in the thickness—i.e., resistence—of the walls of the organs concerned, and so to variations in the distribution of the pressure wave within them.

September, 1918.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY
J. Y. W. MacALISTER
UNDER THE DIRECTION OF
THE EDITORIAL COMMITTEE

VOLUME THE ELEVENTH
SESSION 1917-18

SECTION OF PSYCHIATRY

1805-1834
1907

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1918

Section of Psychiatry.

OFFICERS FOR THE SESSION 1917-18.

President—

R. Percy Smith, M.D.

Vice-Presidents—

William McDougall, M.B., F.R.S.
Bedford Pierce, M.D.

Hon. Secretaries—

Bernard Hart, M.D.
Guy F. Barham, M.D.

Other Members of Council—

Sir R. Armstrong-Jones, M.D.
F. E. Batten, M.D.
A. Helen A. Boyle, M.D.
S. J. Cole, M.D.
M. A. Collins, M.D.
Maurice Craig, M.D.
A. W. Daniel, M.D.
C. C. Easterbrook, M.D.
E. Goodall, M.D.
C. A. Mercier, M.D.
F. W. Mott, M.D., F.R.S.
C. S. Myers, M.D., F.R.S.
J. G. P. Phillips, M.D.
R. H. Steen, M.D.
H. Campbell Thomson, M.D.

Representative on Library Committee—

R. H. Cole, M.D.

Representative on Editorial Committee—

Guy F. Barham, M.D.

SECTION OF PSYCHIATRY.

CONTENTS.

December 4, 1917.

W. H. R. Rivers, M.D., F.R.S. PAGE

The Repression of War Experience 1

April 9, 1918.

Ernest Jones, M.D.

War Shock and Freud's Theory of the Neuroses 21

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

London.
John Bale, Sons and Danielsson, Ltd.,
Oxford House,
83-91, Great Titchfield Street, Oxford Street, W. 1.

Section of Psychiatry.

President — R. Percy Smith, M.D.

(*December* 4, 1917.)

The Repression of War Experience.

By W. H. R. Rivers, M.D., F.R.S.

I do not attempt to deal in this paper with the whole problem of the part taken by repression in the production and maintenance of the war-neuroses. Repression is so closely bound up with the pathology and treatment of these states that the full consideration of its rôle would amount to a complete study of neurosis in relation to the war.

It is necessary at the outset to consider an ambiguity in the use of the term "repression" as it is now used by writers on the pathology of the mind and nervous system. The term is currently used in two senses which should be carefully distinguished from one another. It is used for the *process* whereby a person endeavours to thrust out of his memory some part of his mental content, and it is also used for the *state* which ensues when, either through this process or by some other means, part of the mental content has become inaccessible to manifest consciousness. In the second sense the word is used for a state which corresponds closely with that known as dissociation, but it is useful to distinguish mere inaccessibility to memory from the special kind of separation from the rest of the mental content which is denoted by the term dissociation. The state of inaccessibility may therefore be called "suppression" in distinction from the process of repression. In this paper I use "repression" for the active or voluntary process by which it is attempted to remove some part of the mental content out of the field of attention with the aim of making it inaccessible to memory and producing the state of suppression.

Using the word in this sense, repression is not in itself a pathological process, nor is it necessarily the cause of pathological states. On the contrary, it is a necessary element in education and in all social progress. It is not repression in itself which is harmful, but repression under conditions in which it fails to adapt the individual to his environment.

It is in times of special stress that these failures of adaptation are especially liable to occur, and it is not difficult to see why disorders due to this lack of adaptation should be so frequent at the present time. There are few, if any, aspects of life in which repression plays so prominent and so necessary a part as in the preparation for war. The training of a soldier is designed to adapt him to act calmly and methodically in the presence of events naturally calculated to arouse disturbing emotions. His training should be such that the energy arising out of these emotions is partly damped by familiarity, partly diverted into other channels. The most important feature of the present war in its relation to the production of neurosis is that the training in repression normally spread over years has had to be carried out in short spaces of time, while those thus incompletely trained have had to face strains such as have never previously been known in the history of mankind. Small wonder that the failures of adaptation should have been so numerous and so severe.

I do not now propose to consider this primary and fundamental problem of the part played by repression in the original production of the war-neuroses. The process of repression does not cease when some shock or strain has removed the soldier from the scene of warfare, but it may take an active part in the maintenance of the neurosis. New symptoms often arise in hospital or at home which are not the immediate and necessary consequence of war experience, but are due to repression of painful memories and thoughts, or of unpleasant affective states arising out of reflection concerning this experience. It is with the repression of the hospital and of the home rather than with the repression of the trenches that I deal in this paper. I propose to illustrate by a few sample cases some of the effects which may be produced by repression and the line of action by which these effects may be remedied. I hope to show that many of the most trying and distressing symptoms from which the subjects of war-neurosis suffer are not the necessary result of the strain and shocks to which they have been exposed in warfare, but are due to the attempt to banish from the mind distressing memories of warfare or painful affective states which have come into being as the result of their war experience.

Everyone who has had to treat cases of war-neurosis, and especially that form of neurosis dependent on anxiety, must have been faced by the problem what advice to give concerning the attitude the patient should adopt towards his war experience. It is natural to thrust aside painful memories just as it is natural to avoid dangerous or horrible scenes in actuality. This natural tendency to banish the distressing or the horrible is especially pronounced in those whose powers of resistance have been lowered by the long-continued strains of trench life, the shock of shell explosion, or other catastrophe of warfare. Even if patients were left to themselves, most would naturally strive to forget distressing memories and thoughts. They are, however, very far from being left to themselves, the natural tendency to repress being in my experience almost universally fostered by their relatives and friends, as well as by their medical advisers. Even when patients have themselves realized the impossibility of forgetting their war experiences and have recognized the hopeless and enervating character of the treatment by repression, they are often induced to attempt the task in obedience to medical orders. The advice which has usually been given to my patients in other hospitals is that they should endeavour to banish all thoughts of war from their minds. In some cases all conversation between patients, or with visitors, about the war is strictly forbidden, and the patients are instructed to lead their thoughts to other topics, to beautiful scenery and other pleasant aspects of experience.

To a certain extent this policy is perfectly sound. Nothing annoys a nervous patient more than the continual inquiries of his relatives and friends about his experiences of the Front, not only because it awakens painful memories, but also because of the obvious futility of most of the questions and the hopelessness of bringing the realities home to his hearers. Moreover, the assemblage together in a hospital of a number of men with little in common except their war experiences, naturally leads their conversation far too frequently to this topic, and even among those whose memories are not especially distressing it tends to enhance the state for which the term "fed up" seems to be the universal designation.

It is, however, one thing that those who are suffering from the shocks and strains of warfare should dwell continually on their war experience or be subjected to importunate inquiries; it is quite another matter to attempt to banish such experience from their minds altogether. The cases I am about to record illustrate the evil influence of this latter course of action and the good effects which follow its cessation.

The first case is that of a young officer who was sent home from France on account of a wound received just as he was extricating himself from a mass of earth in which he had been buried. When he reached hospital in England he was nervous and suffered from disturbed sleep and loss of appetite. When his wound had healed he was sent home on leave, where his nervous symptoms became more pronounced so that at his next board his leave was extended. He was for a time an out-patient at a London hospital and was then sent to a convalescent home in the country. Here he continued to sleep badly, with disturbing dreams of warfare, and became very anxious about himself and his prospects of recovery. Thinking he might improve if he rejoined his battalion, he made so light of his condition at his next medical board that he was on the point of being returned to duty when special inquiries about his sleep led to his being sent to Craiglockhart War Hospital for further observation and treatment. On admission he reported that it always took him long to get to sleep at night and that when he succeeded he had vivid dreams of warfare. He could not sleep without a light in his room, because in the dark his attention was attracted by every sound. He had been advised by everyone he had consulted, whether medical or lay, that he ought to banish all unpleasant and disturbing thoughts from his mind. He had been occupying himself for every hour of the day in order to follow this advice and had succeeded in restraining his memories and anxieties during the day, but as soon as he went to bed they would crowd upon him and race through his mind hour after hour, so that every night he dreaded to go to bed.

When he had recounted his symptoms and told me about his method of dealing with his disturbing thoughts, I asked him to tell me candidly his own opinion concerning the possibility of keeping these obtrusive visitors from his mind. He said at once that it was obvious to him that memories such as those he had brought with him from the war could never be forgotten. Nevertheless, since he had been told by everyone that it was his duty to forget them, he had done his utmost in this direction. I then told the patient my own views concerning the nature and treatment of his state. I agreed with him that such memories could not be expected to disappear from the mind and advised him no longer to try to banish them, but that he should see whether it was not possible to make them into tolerable, if not even pleasant, companions instead of evil influences which forced themselves upon his mind whenever the silence and inactivity of the night came round. The possibility of such a line of treatment had never previously occurred to him, but my plan seemed reasonable and he promised to give it a trial. We talked about his war experiences and his anxieties, and following this he had the best night he had had for five months. During the following week he had a good deal of difficulty in sleeping, but his sleeplessness no longer had the painful and distressing quality which had been previously given to it by the intrusion of painful thoughts of warfare. In so far as unpleasant thoughts came to him these were concerned with domestic anxieties rather than with the memories of war, and even these no longer gave rise to the dread which had previously troubled him. His general health improved; his power of sleeping gradually increased and he was able after a time to return to duty, not in the hope that this duty might help him to forget, but with some degree of confidence that he was really fit for it.

The case I have just narrated is a straightforward example of anxiety-neurosis which made no real progress as long as the patient tried to keep out of his mind the painful memories and anxieties which had been aroused in his mind by reflection on his past experience, his present state and the chance of his fitness for duty in the future. When in place of running away from these unpleasant thoughts he faced them boldly and allowed his mind to dwell upon them in the day, they no longer raced through his mind at night and disturbed his sleep by terrifying dreams of warfare.

The next case is that of an officer whose burial as the result of a shell explosion had been followed by symptoms pointing to some degree of cerebral concussion. In spite of severe headache, vomiting and disorder of micturition, he remained on duty for more than two months. He then collapsed altogether after a very trying experience in which he had gone out to seek a fellow officer and had found his body blown into pieces with head and limbs lying separated from the trunk. From that time he had been haunted at night by the vision of his dead and mutilated friend. When he slept he had nightmares in which his friend appeared, sometimes as he had seem him mangled on the field, sometimes in the still more terrifying aspect of one whose limbs and features had been eaten away by leprosy. The mutilated or leprous officer of the dream would come nearer and nearer until the patient suddenly awoke pouring with sweat and in a state of the utmost terror. He dreaded to go to sleep, and spent each day looking forward in painful anticipation of the night. He had been advised to keep all thoughts of war from his mind, but the experience which recurred so often at night was so insistent that he could not keep it wholly from his thoughts, much as he tried to do so. Nevertheless, there is no question but that he was striving by day to dispel memories only to bring them upon him with redoubled force and horror when he slept.

The problem before me in this case was to find some aspect of the painful experience which would allow the patient to dwell upon it in such a way as to relieve its horrible and terrifying character. The aspect to which I drew his attention was that the mangled state of the body of his friend was conclusive evidence that he had been killed outright, and had been spared the prolonged suffering which is too often the fate of those who sustain mortal wounds. He brightened at once, and said that this aspect of the case had never occurred to him, nor had it been suggested by any of those to whom he had previously related his story. He saw at once that this was an aspect of his experience upon which he could allow his thoughts to dwell. He said he would no longer attempt to banish thoughts and memories of his friend from his mind, but would think of the pain and suffering he had been spared. For several nights he had no dreams at all, and then came a night in which he dreamt that he went out into No Man's Land to seek his friend, and saw his mangled body just as in other dreams, but without the horror which had always previously been present. He knelt beside his friend to save for the relatives any objects of value which were upon the body, a pious duty he had fulfilled in the actual scene, and as he was taking off the Sam Browne belt he woke, with none of the horror and terror of the past, but weeping gently, feeling only grief for the loss of a friend. Some nights later he had another dream in which he met his friend, still mangled, but no longer terrifying. They talked together, and the patient told the history of his illness and how he was now able to speak to him in comfort and without horror or undue distress. Once only during his stay in hospital did he again experience horror in connexion with any dream of his friend. During the few days following his discharge from hospital the dream recurred once or twice with some degree of its former terrifying quality, but in his last report to me he had only had one unpleasant dream with a different content, and was regaining his normal health and strength.

In the two cases I have described there can be little question that the most distressing symptoms were being produced or kept in activity by reason of repression. The cessation of the repression was followed by the disappearance of the most distressing symptoms, and great improvement in the general health. It is not always, however, that the line of treatment adopted in these cases is so successful. Sometimes the experience which a patient is striving to forget is so utterly horrible or disgusting, so wholly free from any redeeming feature which can be used as a means of readjusting the attention, that it is difficult or impossible to find an aspect which will make its contemplation endurable. Such a case is that of a young officer who was flung down by the explosion of a shell so that his face struck the distended abdomen of a German several days dead, the impact of his fall rupturing the swollen corpse. Before he lost consciousness the patient had clearly realized his situation, and knew that the substance which filled his mouth and produced the most horrible sensations of taste and smell was derived from the decomposed entrails of an enemy. When he came to himself he vomited profusely, and was much shaken, but "carried on" for several days, vomiting frequently, and haunted by persistent images of taste and smell.

When he came under my care, several months later, suffering from horrible dreams, in which the events I have narrated were faithfully reproduced, he was striving by every means in his power to keep the disgusting and painful memory from his mind. His only period of relief had occurred when he had gone into the country, far from all that could remind him of the war. This experience, combined with the horrible nature of his memory and images, not only made it difficult for him to discontinue the repression, but also made me hesitate to advise this measure with any confidence. During his stay in hospital the dream became less frequent and less terrible, but it still recurred, and it was thought best that he should leave the Army and seek the conditions which had previously given him relief.

A more frequent cause of failure or slight extent of improvement is met with in cases in which the repression has been allowed to continue for so long that it has become a habit. Such a case is that of an officer above the average age who, while looking at the destruction wrought by a shell explosion, lost consciousness, probably as the result of a shock caused by a second shell. He was so ill in France that he could tell little about his state there. When admitted to hospital in England he had lost power and sensation in his legs, and was suffering from severe headache, sleeplessness and terrifying dreams. He was treated by hypnotism and hypnotic drugs, and was advised neither to read the papers nor talk with anyone about the war. After being about two months in hospital he was given three months' leave. On going home he was so disturbed by remarks about the war that he left his relatives and buried himself in the heart of the country, where he saw no one, read no papers, and resolutely kept his mind from all thoughts of war. With the aid of aspirin and bromides he slept better and had less headache, but when at the end of his period of leave he appeared before a medical board and the President asked a question about the trenches, he broke down completely and wept. He was given another two months' leave, and again repaired to the country to continue the treatment by isolation and repression. This went on until the order that all officers must be in hospital or on duty led to his being sent to an inland watering-place, where no inquiries were made about his anxieties or memories, but he was treated by baths, electricity and massage. He rapidly became worse; his sleep, which had improved, became as bad as ever, and he was transferred to Craiglockhart War Hospital. He was then very emaciated, with a constant expression of anxiety and dread. His legs were still weak, and he was able to take very little exercise or apply his mind for any time. His chief complaint was of sleeplessness and frequent dreams in which war scenes were reproduced, while all kinds of distressing thoughts connected with the war would crowd into his mind as he was trying to get to sleep.

He was advised to give up the practice of repression, to read the papers, talk occasionally about the war, and gradually accustom himself to thinking of, and hearing about, war experience. He did so, but in a half-hearted manner, being convinced that the ideal treatment was that he had so long followed. He was reluctant to admit that the success of a mode of treatment which led him to break down and weep when the war was mentioned was of a very superficial kind. Nevertheless, he improved distinctly and slept better. The reproduction of scenes of war in his dreams became less frequent, and were replaced by images the material of which was provided by scenes of home-life. He became able to read the papers without disturbance, but was loth to acknowledge that his improvement was connected with this ability to face thoughts of war, saying that he had been as well when following his own treatment by isolation, and he evidently believed that he would have recovered if he had not been taken from his retreat and sent into hospital. It soon became obvious that the patient would be of no further service in the Army, and he relinquished his commission.

I cite this case not so much as an example of failure, or relative failure, of the treatment by removal of repression, for it is probable that such relaxation of repression as occurred was a definite factor in his improvement. I cite it rather as an example of the state produced by long continued repression and of the difficulties which arise when the repression has had such apparent success as to make the patient believe in it.

In the cases I have just narrated there was no evidence that the process of repression had produced the state of suppression or dissociation. The memories of other painful experience were at hand ready to be recalled or even to obtrude themselves upon consciousness at any moment. A state in which repressed elements of the mental content find their expression in dreams may perhaps be regarded as the first step towards suppression or dissociation, but if so, it forms a very early stage of the process.

There is no question that some people are more liable to become the subjects of dissociation or splitting of consciousness than others. In some persons there is probably an innate tendency in this direction; in others the liability arises through some shock or illness; while other persons become especially susceptible as the result of having been hypnotized.

Not only do shock and illness produce a liability to dissociation, but these factors may also act as its immediate precursors and exciting causes. How far the process of voluntary repression can produce this state is more doubtful. It is probable that it only has this effect in persons who are especially prone to the occurrence of dissociation. The great frequency of the process of voluntary repression in cases of war-neurosis might be expected to provide us with definite evidence on this head and there is little doubt that such evidence is present. As an example I may cite the case of a young officer who had done well in France until he had been deprived of consciousness by a shell explosion. The next thing he remembered was being conducted by his servant towards the base, thoroughly broken down. On admission into hospital he suffered from fearful headaches and had hardly any sleep, and when he slept he had terrifying dreams of warfare. When he came under my care two months later his chief complaint was that whereas ordinarily he felt cheerful and keen on life, there would come upon him at times, with absolute suddenness, the most terrible depression, a state of a kind absolutely different from an ordinary fit of "the blues," having a quality which he could only describe as "something quite on its own."

For some time he had no attack and seemed as if he had not a care in the world. Ten days after admission he came to me one evening, pale and with a tense anxious expression which wholly altered his appearance. A few minutes earlier he had been writing a letter in his usual mood, when there descended upon him a state of deep depression and despair which seemed to have no reason. He had had a pleasant and not too tiring afternoon on some neighbouring hills, and there was nothing in the letter he was writing which could be supposed to have suggested anything painful or depressing. As we talked the depression cleared off and in about ten minutes he was nearly himself again. He had no further attack of depression for nine days, and then one afternoon, as he was standing looking idly from a window, there suddenly descended upon him the state of horrible dread. I happened to be away from the hospital and he had to fight it out alone. The attack was more severe than usual and lasted for several hours. It was so severe that he believed he would have shot himself if his revolver had been accessible. On my return to the hospital some hours after the onset of the attack he was better, but still looked pale and anxious. His state of reasonless dread had passed into one of depression and anxiety natural to one who recognizes that he has been through an experience which has put his life in danger and is liable to recur.

The gusts of depression to which this patient was subject were of the kind which I was then inclined to ascribe to the hidden working of some forgotten yet active experience, and it seemed natural at first to think of some incident during the time which elapsed between the shell explosion which deprived him of consciousness and the moment when he came to himself walking back from the trenches. I considered whether this was not a case in which the lost memory might be recovered by means of hypnotism, but in the presence of the definite tendency to dissociation I did not like to employ this means of diagnosis, and less drastic methods of recovering any forgotten incident were without avail.

It occurred to me that the soldier who was accompanying the patient on his walk from the trenches might be able to supply a clue to some lost memory. While waiting for an answer to this inquiry I discovered that behind his apparent cheerfulness at ordinary times the patient was the subject of grave apprehensions about his fitness for further service in France, which he was not allowing himself to entertain owing to the idea that such thoughts were equivalent to cowardice, or might at any rate be so interpreted by others. It became evident that he had been practising a systematic process of repression of these thoughts and apprehensions, and the question arose whether this repression might not be the source of his attacks of depression rather than some forgotten experience. The patient had already become familiar with the idea that his gusts of depression might be due to the activity of some submerged experience and it was only necessary to consider whether we had not hitherto mistaken the repressed object. Disagreeable as was the situation in which he found himself, I advised him that it was one which it was best to face, and that it was of no avail to pretend that it did not exist. I pointed out that this procedure might produce some discomfort and unhappiness, but that it was far better to suffer so than continue in a course whereby painful thoughts were pushed into hidden recesses of his mind, only to accumulate such force as to make them well up and produce attacks of depression so severe as to put his life in danger from suicide. He agreed to face the situation and no longer to continue his attempt to banish his apprehensions. From this time he had only one transient attack of morbid depression following a minor surgical operation. He became less cheerful generally and his state acquired more closely the usual characters of anxiety-neurosis, and this was so persistent that he was finally passed by a medical board as unfit for military service.

In the cases I have recorded, the elements of the mental content which were the object of repression were chiefly distressing memories. In the case just quoted painful anticipations were prominent, and probably had a place among the objects of repression in other cases. Many other kinds of mental experience may be similarly repressed. Thus, after one of my patients had for long baffled all attempts to discover the source of his trouble, it finally appeared that he was attempting to banish from his mind feelings of shame due to his having broken down. Great improvement rapidly followed a line of action in which he faced this shame and thereby came to see how little cause there was for this emotion. In another case an officer had carried the repression of grief concerning the general loss of life and happiness through the war to the point of suppression, the suppressed emotion finding vent in attacks of weeping, which came on suddenly with no apparent cause. In this case the treatment was less successful, and I cite it only to illustrate the variety of experience which may become the object of repression.

I will conclude my record by a brief account of a case which is interesting in that it might well have occurred in civil practice. A young officer after more than two years' service had failed to get to France, in spite of his urgent desires in that direction. Repeated disappointments in this respect, combined with anxieties connected with his work, had led to the development of a state in which he suffered from troubled sleep, with attacks of somnambulism by night and "fainting fits" by day. Some time after he came under my care I found that, acting under the advice of every doctor he had met, he had been systematically thrusting all thought of his work out of his mind, with the result that when he went to bed battalion orders and other features of his work as an adjutant raced in endless succession through his mind and kept him from sleeping. I advised him to think of his work by day, even to plan what he would do when he returned to his military duties. The troublesome night-thoughts soon went; he rapidly improved and returned to duty. When last he wrote his hopes of general service had at last been realized.

In the cases recorded in this paper the patients had been repressing certain painful elements of their mental content. They had been deliberately practising what we must regard as a definite course of treatment, in nearly every case adopted on medical advice, in which they were either deliberately thrusting certain unpleasant memories or thoughts from their minds or were occupying every moment of the day in some activity in order that these thoughts might not come into the focus of attention. At the same time they were suffering from certain highly distressing symptoms which disappeared or altered in character when the process of repression ceased. Moreover, the symptoms by which they had been troubled were such as receive a natural, if not obvious, explanation as the result of the repression they had been practising. If a person voluntarily represses unpleasant thoughts during the day, it is natural that they should rise into activity when the control of the waking state is removed by sleep or lessened in the state which precedes or follows sleep or occupies its intervals. If the painful thoughts have been kept from the attention throughout the day by means of occupation, it is again natural that they should come into activity when the silence and isolation of the night make occupation no longer possible. It seems as if the thoughts repressed by day assume a painful quality when they come to the surface at night far more intense than is ever attained if they are allowed to occupy the attention during the day. It is as if the process of repression keeps the painful memories or thoughts under a kind of pressure during the day, accumulating such energy by the time night comes that they race through the mind with abnormal speed and violence when the patient is wakeful, or take the most vivid and painful forms when expressed by the imagery of dreams.

When such distressing, if not terrible, symptoms disappear or alter in character as soon as repression ceases, it is natural to conclude that the two processes stand to one another in the relation of cause and effect, but so great is the complexity of the conditions with which we are dealing in the medicine of the mind that it is necessary to consider certain alternative explanations.

The disappearance or improvement of symptoms on the cessation of voluntary repression may be regarded as due to the action of one form of the principle of catharsis. This term is generally used for the agency which is operative when a suppressed or dissociated body of experience is brought to the surface so that it again becomes reintegrated with the ordinary personality. It is no great step from this to the mode of action recorded in this paper, in which experience on its way towards suppression has undergone a similar, though necessarily less extensive, process of reintegration.

There is, however, another form of catharsis which may have been operative in some of the cases I have described. It often happens in cases of war-neurosis, as in neurosis in general, that the sufferers do not suppress their painful thoughts, but brood over them constantly until their experience assumes vastly exaggerated and often distorted importance and significance. In such cases the greatest relief is afforded by the mere communication of these troubles to another. This form of catharsis may have been operative in relation to certain kinds of experience in some of my cases, and this complicates our estimation of the therapeutic value of the cessation of repression. I have, however, carefully chosen for record on this occasion cases in which the second form of catharsis, if present at all, formed an agency altogether subsidiary to that afforded by the cessation of repression.

Another complicating factor which may have entered into the therapeutic processs in some of the cases is re-education. This certainly came into play in the case of the patient who had the terrifying dreams of his mangled friend. In his case the cessation of repression was accompanied by the direction of the attention of the patient to an aspect of his painful memories which he had hitherto completely ignored. The process by which his attention was thus directed to a neglected aspect of his experience introduced a factor which must be distinguished from the removal of repression itself. The two processes are intimately associated, for it was largely, if not altogether, the new view of his experience which made it possible for the patient to dwell upon his painful memories. In some of the other cases this factor of re-education undoubtedly played a part, not merely in making possible the cessation of repression, but also in helping the patient to adjust himself to the situation with which he was faced, thus contributing positively to the recovery or improvement which followed the cessation of repression.

A more difficult and more contentious problem arises when we consider how far the success which attended the cessation of repression may have been, wholly or in part, due to faith and suggestion. Here, as in every branch of therapeutics, whether it be treatment by drugs, diet, baths, electricity, persuasion, re-education or psycho-analysis, we come up against the difficulty raised by the pervasive and subtle influence of these agencies working behind the scenes. In the subject before us, as in every other kind of medical treatment, we have to consider whether the changes which occurred may have been due, not to the agency which lay on the surface and was the motive of the treatment, but at any rate, in part, to the influence, so difficult to exclude, of faith and suggestion. In my later work I have come to believe so thoroughly in the injurious action of repression, and have acquired so lively a faith in the efficacy of my mode of treatment, that this agency cannot be excluded as a factor in any success I may have. In my earlier work, however, I certainly had no such faith, and advised the discontinuance of repression with the utmost diffidence. Faith on the part of the patient may, however, be present even when the physician is diffident. It is of more importance that several of the patients had been under my care for some time without improvement until it was discovered that they were repressing painful experience. It was only when the repression ceased that improvement began.

Definite evidence against the influence of suggestion is provided by the case in which the dream of the mangled friend came to lose its horror, this state being replaced by the far more bearable emotion of grief. The change which followed the cessation of repression in this case could not have been suggested by me, for its possibility had not, so far as I am aware, entered my mind. So far as suggestions, witting or unwitting, were given, these would have had the form that the nightmares would cease altogether, and the change in the affective character of the dream, not having been anticipated by myself, can hardly have been communicated to the patient. It is, of course, possible that my own belief in the improvement which would follow the adoption of my advice acted in a general manner by bringing the agencies of faith and suggestion into action, but these agencies can hardly have produced the specific and definite form which the improvement took. In other of the cases I have recorded, faith and suggestion probably played some part, that of the officer with the sudden and overwhelming attacks of depression being especially open to the possibility of these influences.

Such complicating factors as I have just considered can no more be excluded in this than in any other branch of therapeutics, but I am confident that their part is small beside that due to stopping a course of action whereby patients were striving to carry out an impossible task. In some cases faith and suggestion, re-education and sharing troubles with another, undoubtedly form the chief agents in the removal or amendment of the symptoms of neurosis, but in the cases I have recorded there can be little doubt that they contributed only in a minor degree to the success which attended the giving up of repression.

Before I conclude, a few words must be said about an aspect of my subject to which I have not so far referred. When treating officers or men suffering from war-neurosis, we have not only to think of the restoration of the patient to health, we have also to consider the question of fitness for military service. It is necessary to consider briefly the relation of the prescription of repression to this aspect of military medical practice.

When I find that a soldier is definitely practising repression, I am accustomed to ask him what he thinks is likely to happen if one who has sedulously kept his mind from all thoughts of war, or from special memories of warfare, should be confronted with the reality, or even with such continual reminders of its existence as must inevitably accompany any form of military service at home. If, as often happens in the case of officers, the patient is keenly anxious to remain in the Army, the question at once brings home to him the futility of the course of action he has been pursuing. The deliberate and systematic repression of all thoughts and memories of war by a soldier can have but one result when he is again faced by the realities of warfare.

Several of the officers whose cases I have described or mentioned in this paper were enabled to return to some form of military duty with a degree of success very unlikely if they had persisted in the process of repression. In other cases, either because the repression had been so long continued or for some other reason, return to military duty was deemed inexpedient. Except in one of these cases, no other result could have been expected with any form of treatment. The exception to which I refer is that of the patient who had the sudden attacks of reasonless depression. This officer had a healthy appearance, and would have made light of his disabilities at a Medical Board. He would certainly have been returned to duty and sent to France. The result of my line of treatment was to produce a state of anxiety which led to his leaving the Army. This result, regrettable though it be, is far better than that which would have followed his return to active service, for he would inevitably have broken down under the first stress of warfare, and might have produced some disaster by failure in a critical situation or lowered the morale of his unit by committing suicide.

In conclusion, I must again mention a point to which reference was made at the beginning of this paper. Because I advocate the facing of painful memories, and deprecate the ostrich-like policy of attempting to banish them from the mind, it must not be thought that I recommend the concentration of the thoughts on such memories. On the contrary, in my opinion it is just as harmful to dwell persistently upon painful memories or anticipations, and brood upon feelings of regret and shame, as to attempt to banish them wholly from the mind. It is necessary to be explicit on this matter when dealing with patients. In a recent case in which I neglected to do so, the absence of any improvement led me to inquire into the patient's method of following my advice, and I found that, thinking he could not have too much of a good thing, he had substituted for the system of repression he had followed before coming under my care, one in which he spent the whole day talking, reading, and thinking of war. He even spent the interval between dinner and going to bed in reading a book dealing with warfare.

There are also some victims of neurosis, especially the very young, for whom the horrors of warfare seem to have a peculiar fascination, so that when the opportunity presents itself they cannot refrain from talking by the hour about war experiences, although they know quite well that it is bad for them to do so. Here, as in so many other aspects of the treatment of neurosis, we have to steer a middle course. Just as we prescribe moderation in exercise, moderation at work and play, moderation in eating, drinking, and smoking, so is moderation necessary in talking, reading, and thinking about war experience. Moreover, we must not be content merely to advise our patients to give up repression, we must help them by every means in our power to put this advice into practice. We must show them how to overcome the difficulties which are put in their way by enfeebled volition, and by the distortion of their experience due to its having for long been seen exclusively from some one point of view. It is often only by a process of prolonged re-education that it becomes possible for the patient to give up the practice of repressing war experience.

I am indebted to Major W. H. Bryce, R.A.M.C., for permission to publish the cases recorded in this paper, and for his never-failing support and interest while I was working under his command in Craiglockhart War Hospital.

DISCUSSION.

Dr. ERNEST JONES: It is gratifying and even novel to hear Dr. Rivers confirm Freud's views that repression, in spite of being a natural defence mechanism, can, in certain circumstances, be exaggerated when it fails in its purpose, and may be harmful. The other main point in Dr. Rivers' paper—namely, that the harmful effects of unsuccessful repression can be partly undone by inculcating an opposite attitude of mind, is practically identical with the cathartic abreaction that constituted the first stage in Freud's psycho-analytic method of treatment. The instinctive resistance mentioned by Dr. Rivers, which is displayed against this attitude both by the patient and by his medical advisers, is a manifestation of the repressive tendency itself. I wish to point out that, although the phenomenon of repression is more easily observed in relation to what may be called external experiences, grief, &c., it is nothing like so extensive or so important pathologically in this sphere as in that of what may be called internal experiences, desires, thoughts, &c., that arise from within, and, indeed, it needs the calamitous happenings of this great war to make the former very manifest at all. It is all the more important, therefore, that the latter group should not be overlooked. They provide the key to the understanding of the individual problems in connexion with the war-neuroses, why one man suffers more than, and differently, from another in the same situation, why particular symptoms appear, and why a case may resist treatment that deals only with the war experience. It is also these previously repressed impulses in the personality that lend the obviously dynamic character to the war traumata, and cause the memory of them to haunt the mind. The intimate relation of pleasure to pain in the primitive unconscious mind has to be remembered in this connexion.

Dr. MAURICE NICOLL: Does Dr. Rivers consider that repression of battle experiences fully accounts for war neuroses? In profound war shock there seems to be a collapse of the whole personality, and a return to a state of infantility of varying degree. The great conception of Freud of the importance of repression in causing neuroses is of immense value in treatment, but the conception of *regression* is also valuable. Regression is to be conceived as a retracing of the path of personal development, and a return to a mode of behaviour that belongs to the past. Dr. Jung, of Zürich, who regards the neurosis as the result of a failure in adaptation, teaches that when reality contains a task that is formidable, regression may occur away from the task, and an inferior mode of function substituted for the superior or adult mode of function. The psychic structure of the individual collapses, and its upper or most recently formed storeys pass into the unconscious. The battle dream—that is, the pure recapitulation of actual battle scenes—is pathognomonic of regression, and once an individual has true battle dreams he is no longer wholly responsible, for regression has begun and part of his "growing fit" has been inverted into the unconscious. Spontaneous recovery is then unlikely on the battlefield. Treatment must now be directed towards finding a *way out* for that part of the personality that has collapsed into the unconscious. In this respect the dream, when it has passed from pure battle incidents, and begins to deal with other material, constitutes a valuable guide as regards the best "way out" for the individual. It must be remembered that Jung takes a view of the unconscious that differs essentially from that of Freud. Jung regards the unconscious in the neurotic as endeavouring to push the individual towards successful adaptation. When regression occurs the unconscious seeks to get rid of the regressed material, and shows the aim of its activity in the dream.

Dr. EDER: Suggestion can, I think, be ruled out in these cases because, as Dr. Rivers has shown, the patients had been long and unsuccessfully treated by suggestions from both medical and lay friends: being strongly urged to try to forget their war experiences. The power of suggestion is, I think, too much of a bugbear to many. In Dr. Rivers' cases the reasonable conclusion must surely be that the success was due to the "abreaction." I agree with Dr. Jones that in some war experiences, where a comrade who has been killed alongside the patient is the subject of painful dreams and reminiscences, there will be found links with earlier ideas or feelings relating to the patient's family. I have published some analyses of cases of this kind. It is noteworthy that in one of the dreams related by Dr. Rivers the mutilated body of the patient's friend became a leprous body. These are instances of regression in Jung's sense. In other cases regression expresses the wish for an earlier (infantile) adaptation or even for death; such wishes being more or less simulated by the symptoms. "Battle dreams" have, I agree with Dr. Nicoll, some diagnostic value. The patient continues to make the manifest content of his dream that of his painful war experiences so long as the symptoms are acute. The manifest content begins to take up its material from his ordinary daily surroundings, as do most dreams, as improvement sets in. This merely means that attention is now being directed to his daily surroundings. It has nothing to do, of course, with the latent content of the dream or its meaning.

Dr. W. H. B. STODDART: I suggest to Dr. Rivers that it would be better to reverse the meanings of the words "repression" and "suppression" as used in the paper, seeing that the present generally accepted meaning of "repression" is that which he has attached to the word "suppression." To continue to use these words in a new sense will lead to confusion. Are the cases diagnosed as "anxiety neurosis" really examples of that disorder, whose characteristic symptoms are such physical disturbances as palpitation, vomiting, diarrhœa, polyuria, difficulties of respiration, tremor, &c., while mental anxiety plays almost a subsidiary rôle?

Dr. C. M. TUKE: I am glad to hear that Dr. Rivers speaks of "moderation" as regards this treatment. I think that much depends on the special circumstances of each individual case, and the degrees of mental power and previous education and training of the patient. In one case seen, of a young officer invalided home for shell shock without a wound, it was found that he did nothing but talk of his experiences. On being asked if he thought of nothing else, he replied: No, he did not. A few weeks' trout-fishing in the country sufficed to put him right. In a second case, of a private soldier, whose appetite was unimpaired, but who woke shouting in the night frequently, dreaming that he was in the trenches, a few doses of suitable medicine did much to cure him. I think that much depends on the tact and discretion of the medical officer in charge, and that no hard and fast line of treatment can be laid down.

Dr. RIVERS (in reply): The object of my paper was to deal with a practical problem of psycho-therapeutics, and I avoided as far as possible reference to the theoretical side of the subject. I am glad that several speakers have called attention to the bearing of my results on the more fundamental part of Freud's theory of neurosis, a part which, in the heat engendered by the discussion of other aspects, has attracted little notice in this country.

I do not suppose that repression is the only cause of war-neurosis. In my opinion it is a mistake to regard repression and regression as in any way contradictory or mutually exclusive. As my paper shows, repression, in the sense in which I use the term, is a process which produces or aggravates neurosis, while regression is a character of the neurosis itself, a mode of reacting to the environment which is set up, not only by repression, but in other ways. Even when repression has proceeded to the length of suppression, we still have to do with a condition underlying the neurosis, and not with a character of the neurosis itself.

I hoped that I had made it clear that I believe faith and suggestion to have taken only a very small part in the improvement shown by my cases, and that only in some of them. I should have been neglecting an obvious duty if I had failed to draw attention to the possibility that these elusive agencies may have had more influence than I suppose.

When a term has been used for two quite different things, its limitation to one of the two meanings must always for a time produce a certain amount of confusion. When technical terms are taken from the language of every day, they should always be used in a sense approaching as nearly as possible their popular meaning. I believe that the sense in which I propose to use "repression" and "suppression" agrees more closely than the reverse with their ordinary meaning.

I believe that the experience arising out of the War has shown conclusively that the term "anxiety-neurosis" has hitherto been used by the followers of Freud in too narrow a sense. I follow a usage now coming widely into vogue according to which anxiety-neurosis is the most appropriate term for a syndrome of which the essential underlying condition is anxiety.

Section of Psychiatry.

President — Dr. R. PERCY SMITH.

War Shock and Freud's Theory of the Neuroses.[1]

By ERNEST JONES, M.D.

A MATTER that used to hamper the opponents of psycho-analysis to some extent was that there was no alternative theory of the neuroses seriously tenable. It was clearly impossible to explain all neurotic manifestations by the catch-word use of the two terms "heredity" and "suggestion," for our conceptions of heredity, however important in this connexion they may well become in the future when more is known of the subject, are at present too vague to explain any complex psychological phenomena, and the idea of suggestion merely introduces yet another problem without solving any of the old ones.

The experience of neurotic affections engendered by the War, however, has enabled the critics of psycho-analysis to put forward the view that the factors invoked by Freud in explanation of these affections need not be present and therefore cannot be regarded as essential, in the way maintained by him, whereas on the other hand a different set of factors is undeniably present and operative; not only so, but these latter factors are held to be all-sufficing, so that it is not necessary to search for any others in the ætiology of the conditions in question. Some opponents of psycho-analysis, particularly those more concerned with combating an unwelcome theory than with ascertaining truth, have even maintained that the experience of the War has proved *all* Freud's views to be utterly untenable and false.

It would be easy to criticize the standpoint thus adopted, though that is in no sense my purpose here. Two points alone may be raised. If, as some writers assert, the strain of war conditions is in itself sufficient to account for the development of a psychoneurosis without the introduction of any other factor, then how is one to explain the actual incidence of war neuroses? Neurotic symptoms amounting to a definite clinico-pathological condition are by no means so common as is sometimes stated. I do not know of any statistics on the matter, but I should be surprised to hear that more than 2 per cent. of the Army serving in France are affected in this way. This consideration in itself shows that some other factors than war strain must be involved, factors relating to the previous disposition of the men affected, and the problem is to determine what these are. In the second place, as to the dogmatic assertion that Freud's theory of the psychoneuroses cannot apply to those arising under war conditions. An essential feature of this theory is that psychoneuroses result from unconscious mental conflicts. To ascertain whether these are operative in a given case, therefore, it is obviously necessary to employ some method, such as psycho-analysis, which gives access to the unconscious. It may, I think, be taken as certain that those who deny the action of these conflicts in either the war neuroses or in what, by way of contradistinction, must be called the peace neuroses, have not thought it necessary to use any such method, and they thus place themselves in a position very similar to that of a writer who would on *a priori* grounds deny the details or even the existence of histology without ever having looked through a microscope, the only avenue to histology. I choose this simile because it seems to me that the relation of psycho-analysis to clinical psychiatry is not at all inaptly described[1] as being like that of histology to anatomy. Or one might draw an analogy from a strictly medical field. If some one were to take a series of cases of tuberculosis supervening on measles or typhoid, and then maintain that because this ætiological factor was present therefore no micro-organism could be, so that Koch's views as to the causation of tuberculosis were entirely unfounded, one would surely have the right to ask whether any search for the bacillus had been made in the cases in question, and to satisfy oneself that the observer had grasped the difference between essential and merely exciting causes of disease. If the answer to both these inquiries was in the negative no great weight would be attached to the claim that Koch's theory of the nature of tuberculosis had been demolished. Yet this is precisely the order of scientific thinking evinced by those who maintain that Freud's theory of the neuroses has been demolished by the simple observation that they may manifest themselves under the stress of warfare.

---

[1] At a meeting of the Section, held April 9, 1918

I do not mean, however, to assert the contrary of this proposition—namely, that the validity of Freud's theory has been proved in the case of war neuroses, as I would maintain it has been in the case of peace neuroses. I simply hold that the matter is at present *sub judice*, and must remain so until sufficiently extensive investigations shall have settled the question one way or the other. It so happens that the traumatic neuroses are the field in psychopathology that has hitherto been the least explored by psycho-analysis even in peace time, while the opportunity of psycho-analytic investigation of the war neuroses has, in this country at least, been so meagre that the time is not ripe for any generalization on the subject. Personally, I have examined a considerable number of cases in the cursory way that is usual in hospital work, but I have been able to make an intensive psycho-analytic study in only some half-dozen cases, and I do not know of any other cases that have been investigated by the psycho-analytic method. In spite of this paucity of material, a feature which is inherent in intensive work, the critic of psycho-analysis may legitimately demand of the analyst, who advances considerable pretensions in regard to understanding the pathology of neurotic affections in general, that he should be able to formulate some tentative conception of the relation between the phenomena commonly observed in the war neuroses and the psycho-analytical theory. In the following remarks an attempt will be made to meet this demand, although, as has just been explained, there can be no question of solving the numerous and as yet unstudied problems raised by the observations made in connexion with war shock.

---

[1] By Freud, "Allgemeine Neurosenlehre," 1917, p. 286.

It is desirable in the first place to clear away some general misconceptions on the subject. The task of assimilating our new experiences in connexion with the War with any previously held theory of neurotic affections has undoubtedly been rendered more difficult by the attitude of those workers whose interest in such problems is of contemporary origin. They lay much too much emphasis on the newer and perhaps more sensational aspects of the phenomena observed, instead of trying to correlate the more familiar and better understood ones. This attitude has been so pronounced with some writers that one might almost imagine that before the War there had never been such calamities as wrecks, earthquakes, and railway accidents, and that men had never been tried to the limit of their endurance with privation, fatigue, and danger, while familiar symptoms like hysterical blindness and paralysis are thought worthy of detailed description and are treated almost as novelties in psychological medicine. So far as I know, however, although some symptoms—e.g., dread of shells—assume a form that is coloured by war experiences, no symptom, and hardly any grouping of symptoms, occurs in war neuroses that is not to be met with in the neuroses of peace, a fact which in itself would suggest that fundamentally very similar agents must be at work to produce the neurosis in both cases.

Another very prevalent misconception, one strengthened by the official use of that unfortunate catch-word "shell shock," is that war neuroses constitute a more or less unitary syndrome. It is so often forgotten that the term "shell shock" can only mean, and no doubt was originally intended to mean, a certain ætiological factor, and not the disease itself. I have preferred to use the less ambiguous and more obviously ætiological term "war shock," one coined, I think, by Eder.[1] Even when the term "shell shock" is avoided, its place is usually taken by the all-embracing expression "neurasthenia," in most cases, in fact, where there are no physical symptoms of hysteria present. True neurasthenia in its strict sense, on the contrary, is a relatively rare complaint, certainly in anything like a pure form; I have not come across a single case myself in connexion with the War. The results of war strain are anything but unitary; most of the diverse forms of neurosis and psychoneurosis are found to be represented, and until these are adequately distinguished one from another it is impossible to make any satisfactory study of their individual pathology. A further point still more often over-looked, and perhaps even more important, is that not only are the results diverse, but the ætiological factors concerned in war strain are much more complex than is sometimes realized. Careful study of the cases shows that what was the most important pathogenetic agent with one patient had nothing to do with the neurosis of a second patient although he may have been equally exposed to its influence. For instance, the sight of a near friend being killed may have greatly affected one soldier and have been closely related to his subsequent neurosis, whereas with a second patient who has gone through the same experience there may be no connexion between it and *his* neurosis; the same applies to the other painful features of warfare, the tension of waiting under shell fire, the experience of being buried alive, and so on. These considerations indicate the great importance of the individual factor predisposing to particular neurotic reactions, and point to the necessity for careful dissection of the various pathogenetic factors in a number of cases before making generalizations as to the way in which the numerous separate influences grouped together as war strain may operate.

---

[1] Eder, "War Shock," 1917.

Coming now to the points of contact between war experience and Freud's theory, one may remark to begin with how well the facts of the War itself accord with Freud's view of the human mind as containing beneath the surface a body of imperfectly controlled and explosive forces which in their nature conflict with the standards of civilization. Indeed, one may say that war is an official abrogation of civilized standards. The manhood of a nation is in war not only allowed, but encouraged and ordered to indulge in behaviour of a kind that is throughout abhorrent to the civilized mind, to commit deeds and witness sights that are profoundly revolting to our æsthetic and moral disposition. All sorts of previously forbidden and buried impulses, cruel and sadistic, murderous and so on, are stirred to greater activity, and the old intrapsychical conflicts, which, according to Freud, are the essential cause of all neurotic disorders, and which had been dealt with before by means of "repression" of one side of the conflict, are now reinforced and the person compelled to deal with them afresh under totally different circumstances.

It is plain, as MacCurdy has well pointed out,[1] that men entering the Army, and particularly on approaching the battle-field, have to undergo a very considerable readjustment of their previous attitudes of mind and standards of conduct, a readjustment which is much greater in the case of some men than in that of others, and also one which some men find it much more easy to accomplish satisfactorily than do others. The man's previous standards of general morality, of cleanliness and æsthetic feeling, and of his relation to his fellow man, have all to undergo a very considerable alteration. In all directions he has to do things that previously were repugnant to his strongest ideals. These ideals are ascribed by some — e.g., Trotter,[2] and, following him, MacCurdy—to the operation of the herd instinct, in other words, to the influence of the social *milieu* in which he may happen to have been brought up. Personally I think that behind this influence there are still deeper factors at work of a more individual order, derived essentially from hereditary tendencies and the earliest relation of the child to its parents. However this may be, it is certain that every one has such ideals, though he may not describe them under this name, and that in the course of development he insensibly builds up a series of standards of which his ego approves—and which I therefore propose to refer to by Freud's term of the "ego ideal"—together with a contrasting series of which his ego disapproves.

---

[1] MacCurdy, "War Neuroses," *Psychiatric Bull.*, July, 1917. pp. 252, 253.

[2] Trotter, "Instincts of the Herd in Peace and War," 1916.

As every student of genetic psychology knows, this gradual building up is never performed smoothly, but always after a number of both conscious and unconscious internal conflicts between the ego on the one side and various impulses and desires on the other, after a series of partial renunciations and compromises. Further, it is exceptional for the whole result to be satisfactory; there always remain certain fields, more especially in the realm of sex, where the resolution of the conflict is an imperfect one, and, according to Freud, it is just from this imperfect resolution that neurotic affections arise. The question whether a neurosis will result in a given case is essentially a quantitative one. The mind has the capacity of tolerating without harm a certain amount of stimulation from these internal impulses and desires that are not in unison with the ego, and when this limit is passed the energy derived from them flows over into neurotic manifestations. The mind has several methods for dealing with the energy of the anti-ego impulses successfully—that is to say, without the impairment of mental health—and it is only when these methods are inadequate to deal with the whole that neurosis ensues. Two of these methods may especially be noted. One is the deflection of the energy in question from its primitive and forbidden goal to another one in harmony with the more social standards of the ego; as every schoolmaster knows, sport is an excellent example of this. When the primitive goal was a sexual one, this process of deflection, here on to a non-sexual goal, has been given the name of "sublimation," but there are similar refining and modifying processes at work in connexion with all anti-ego impulses—e.g., cruelty. A second method is to keep the energy in a state of repression in the unconscious, the conscious mind refusing to deal directly with it and guarding itself against its influence by erecting a dam or barrier against it, known as a reaction-formation. Thus in the case of primitive cruelty, a cruel child may develop into a person to whom the very idea of inflicting cruelty is alien and abhorrent, the original impulse having been quite split off from the ego into the unconscious, and its place taken in consciousness by the reaction-formation barrier of horror and sensitiveness to pain and suffering. In such ways as these a state of practical equilibrium is attained in the normal, the power of the ego-ideal having proved sufficient either to utilize for its own purposes (by means of modifying), or to keep at bay, the impulses and desires that are out of harmony with it. In some people the state of equilibrium thus attained is of considerable stability, they have what is popularly called a reserve of mental and moral force with which they can meet disappointments, difficulties, and emergencies of various kinds in life, which means in practice that their capacity for readjustment to radically new situations is fairly elastic.

Now on approaching the field of war the readjustment necessary is one of the more difficult ones experienced in life, although it is by no means so difficult as can arise in various situations appertaining to the field of sex. It is an adjustment which practice shows is possible to the large majority of men, but there is no doubt that the success with which it is carried out is extremely variable in different people; and it probably varies in the same person from time to time for either internal reasons or for external reasons relating to the precise environment at the moment, to the precise war experiences through which they may be passing. It is further clear that the readjustment is likely to vary in its success almost entirely with the success with which the earlier adjustments were made during the development of the individual. This statement is meant to carry more than its obvious meaning that the more stable a man is the more surely can he meet the problems and difficulties of warfare; it has a deeper implication—namely, there is an important relationship between the two phases of difficult adjustment, the current one and the older one. Fundamentally it is the same difficulty, the same conflict; it is only the form that is different. Let us suppose, for instance, that the original difficulty in adjustment was over the matter of cruelty, that in childhood the conflict between strong tendencies of this kind and perhaps specially strong ideals of the contrary sort was an exceptionally sharp one, so that it was never very satisfactorily resolved, though a working equilibrium may have been established on the basis of powerful reaction-formations and various protective devices for avoiding in every way possible contact with the subject of cruelty. Such a man may well have unusual difficulty in adapting himself to the cruel aspects of war, which really means that his long buried and quite unconscious impulses to cruelty, impulses the very possibility of whose existence he would repudiate with horror, are stimulated afresh by the unavoidable sights and deeds of war. In bayonet practice, for instance, the man is taught how best to inflict horrible injuries, and he is encouraged to indulge in activities of this order, from the very thought of which he has all his life been trying to escape. He now has to deal afresh with the old conflict in him between the two sides of his nature, with the added complication that there has to take place an extensive revaluation of his previous standards, and in important respects an actual reversal of them. He has to formulate new rules of conduct, to adopt new attitudes of mind, and to accustom himself to the idea that tendencies of which he had previously disapproved with the whole strength of his ego ideal are now permissible and laudatory under certain conditions. One would get a very erroneous view of the picture I am trying to draw if one imagined that the process of readjustment in question goes on in the person's consciousness. This is never entirely true, and often not at all true; the most important part of the readjustment, and often the whole part, is quite unconscious. We thus see that to obtain a proper understanding of the problems of an individual case, and to be able to deal with them practically in therapeutics, it is often necessary to appreciate the relation between a current conflict and an older one, for the real strength and importance of the current conflict is often due to the fact that it has aroused buried and imperfectly resolved older conflicts.

I have taken the one instance of cruelty, but there are many others in connexion with warfare. It may, indeed, be said in general that the process of re-adaptation in regard to war consists of two distinct sides: on the one hand, war effects an extensive release of previously tabooed tendencies, a release shown in endless ways, for instance, even in the language of camps, and on the other hand the acquiring of a strict discipline and self-control along lines widely different from those of peace times. The one is a correlative of the other, and we have perhaps in these considerations a psychological explanation of the feature of military life that is so puzzling to most civilians—namely, the extraordinary punctiliousness that a rigid discipline attaches to matters which to the outsider appear so trivial. An undisciplined army has always been the bane of commanders, and perhaps the risks attaching to indiscipline are related to the release of imperfectly controlled impulses that war deliberately effects.

The way in which a relative failure in war adaptation may lead to a neurosis can be illustrated by a parallel drawn from the more familiar problems of peace neuroses. Imagine a young woman who has never been able to reconcile the sexual sides of her nature with her ego ideal, and whose only way of dealing with that aspect of life has been to keep it at as great a distance from her consciousness as possible. If now she gets married it may happen that she will find it impossible to effect the necessary reconciliation, and that, being deprived of the *modus vivendi*—namely, the keeping sexuality at a distance—which previously made it possible to maintain a mental equilibrium, she will develop a neurosis in which the repressed sexual desires achieve a symbolic and disguised expression. Similarly in a war neurosis when the old adjustment between the ego ideal and the repressed impulses is taken away, it may prove impossible to establish a fresh one on the new conditions, and then the repressed impulses will find expression in some form of neurotic symptom.

So far as I can judge, the specific problems characteristic of the war neuroses are to be found in connexion with two broad groups of mental processes. One of these relates to the question of war adaptation considered above, the other to that of fear. The latter is hardly to be regarded as a sub-group of the former, inasmuch as there is no readjustment or revaluation of values concerned, as there typically is with the former. The moral attitude towards fear, and the conflicts arising in connexion with it, remain the same in war as in peace. In both cases it is considered a moral weakness to display or be influenced by fear, and especially to give in to it at the cost of not doing one's duty. The soldier who would like to escape from shell fire is, so far as moral values are concerned, in the same position as a man in peace time who will not venture his life to save a drowning child. Indeed, the conflict cannot be as sharp in the case of the soldier, for he would find very widespread and thorough sympathy for his quite comprehensible desire, and there would be much less social blame or guilt attaching to him than to the man in the other situation mentioned. So that the problem of fear, which all agree plays a central part in connexion with the typical war neuroses, seems to be apart from that of war adaptation in general as expounded above.

Before discussing the problem of fear, however, I should like at this point to review the position and see how far we have got in the attempt to approximate the facts of war neuroses to the psycho-analytical theory. This theory of the neuroses is a very elaborate one, but it is possible to formulate the main principles of it along fairly simple lines, and I now propose to do this in a series of statements:—

(1) The first principle in Freud's theory of neurotic symptoms is that they are of volitional origin. This principle, long suspected by both the medical and the lay public, and the real reason why in the past they have been so confounded with malingering, would be at once evident were it not for the fact that it is not true of volition in the ordinary sense of conscious deliberate voluntary purpose. In other words, it is not true of the will as a whole, but only of a part of it—

namely, a part that the patient is not aware of. Thus, neuroses are not diseases or accidents that happen to a person, as the French school of psychopathology maintains, but are phenomena produced and brought about by some tendency in the person's mind, and for specific purposes. Freud distinguishes three classes of motives that operate in this way: one essential, the other two not. The indispensable one is an unconscious desire to obtain pleasure by gratifying in the imagination some repressed and dissociated impulse, a motive, therefore, arising in the part of the mind that is not in harmony with the ego ideal. A second motive is to achieve some end in the outer world, for instance sympathy from an unkind husband, which the person finds easier to do by means of a neurosis than in other ways. The third set of motives has the same purpose as the last, but may be distinguished from it in that it concerns the making use of an already existing neurosis rather than the helping to bring one about. Both the latter sets are usually, but not always, unconscious; more strictly, they are preconscious, that is, they do not relate to deeply buried tendencies, and so are correspondingly easy to reveal; Freud terms them the primary and secondary "gain of illness" respectively. Now I imagine that this principle of volitional origin is no longer very widely questioned by modern psychopathologists, and in the case of war neuroses the main motives are visible and comprehensible enough—namely, the desire to find some good reason for escaping from the horrors of warfare.

(2) The second principle is that all neurotic symptoms are the product of an intrapsychical conflict which the person has failed satisfactorily to resolve, and that they constitute a compromise formation between the two conflicting forces. Here again I think that those who have been investigating the psychology of war neuroses will agree with this principle. MacCurdy,[1] in particular, has described in great detail the conflict that arises in soldiers between, on the one hand, the motives actuating to continuance at duty and concealment of growing sense of incapacity and apprehension, and, on the other, the awful sense of failure accompanying the sometimes almost overwhelming desire to escape from the horrors of their position. The neurosis offers a way out of this dilemma, the only way that the particular person is able to find, and the actual symptoms, which are often grossly incapacitating, such as blindness, represent the fulfilment of the desire against which the man has been fighting. We reach, therefore, the wish-fulfilment part of Freud's theory.

[1] MacCurdy, op. cit.

(3) The third principle is that the operative wish that leads to the creation of the neurosis is an unconscious one. Freud means this in the full sense of the word, and in this sense the principle has not yet been confirmed from the experiences of the war neuroses. There are, however, different degrees of unconsciousness of a mental process, and the important point to Freud is not so much the degree of the unawareness in itself—this being largely an index of the repression—as the repression or dissociation that has led to the unawareness. What he maintains is that the wish producing the neurosis is one that is not in harmony with the ego ideal and which is therefore kept at as great a distance as possible from it. Anyone who has read the touching accounts given by MacCurdy or Rivers[1] of the shame that soldiers feel at their increasing sense of fear, and the efforts they make to fight against it, to conceal it from others and if possible from themselves, will recognize that the wish in question is one alien to the ego ideal and is well on in the first stages of repression, even if it is half-avowed.

(4) The fourth principle is that current repressed wishes cannot directly produce a neurosis, but do so only by reviving and reinforcing the wishes that have been repressed in older unresolved conflicts. According to Freud, a pathogenetic disappointment or difficulty in re-adjustment leads first to an introversion, or turning inwards of feeling, and the wish that has been baulked seeks some other mode of gratification. It tends to regress back to an older period of life and thus to become associated with similarly baulked and repressed wishes belonging to older conflicts. It is the combination of these two, the present and the old, that is the characteristic mark of the pathogenesis of neurotic disorders as distinct from other modes of reaction to the difficulties of life.

Freud considers that there are probably always three factors in the causation of any neurosis—a specific hereditary predisposition; secondly, an unresolved infantile conflict, which means that the person has not satisfactorily developed past a given stage of individual evolution—in other words, that he has been subjected to what is called an "infantile fixation" at a given point in development; and the current difficulty. There is a reciprocal relationship between these three factors, so that if any one is especially pronounced the others may be correspondingly less important. For instance, if the hereditary factor is very pronounced then a person may become neurotic from the quite ordinary experiences of childhood and adult life, for he is incapable of dealing adequately with them. In the case of war neuroses it is evident that the current factor is of the greatest importance, being, indeed, the only one that so far has attracted attention. The only traces of infantile factors I have seen noted have been the instances where the localization of hysterical symptoms seem to have been determined in part by the site of old injuries and in a general way the many traits of childhood, such as sensitiveness to slights, self-centredness, and desire to be guarded, protected and helped, which are sometimes very evident in the cases of war neurosis.

---

[1] Rivers, "The Repression of War Experience," *Proceedings*, 1918, xi (Sect. of Psych.), p. 1.

We thus see that only one half of the psycho-analytical theory has so far been confirmed by the observations of war neuroses. According to this theory, there are typically two sets of wishes concerned in the production of any neurosis. One of these, the "primary gain of illness," a current one, alien to the conscious ego ideal, and therefore half repressed and only half conscious—if that—has not only been demonstrated by a number of observers, but has been shown to be of tremendous importance, and certainly the effects of treatment largely turn on the way in which it is dealt with. The other factor, the infantile and altogether repressed and unconscious one, which, according to psycho-analysis, is also essential to the production of a neurosis, has not been systematically sought for, though I have found it in the few cases of which I have been able to make a full study. Its presence or absence is a matter of greater theoretical importance than might perhaps appear, even though its practical importance may often not be great. For my own part I have the utmost difficulty in believing that a current wish, however strong, that is half conscious and sometimes fully conscious can ever in itself produce a neurosis, for it contradicts all one's knowledge concerning the nature of neuroses as well as my experience, such as it is, of war neuroses themselves. I would therefore urge that no conclusion is possible on the matter one way or the other until adequate investigations have been carried out. That it has its practical side also will be pointed out when we come to consider the chronic cases where war neuroses pass over into peace neuroses.

(5) The principle of the psycho-analytical theory that has aroused the strongest opposition is that the primary repressed wish ultimately responsible for the neurosis is always of a sexual nature, so that the conflict is between the two groups of instincts that go to make up the whole personality, those concerned respectively with preservation of the self and of the species. MacCurdy has suggested to me that this is only because, apart from war, there is no instinct that comes into such strong

conflict with the ego ideal as does the sexual one, but that in war the conflict between the instinct for self-preservation and the ego ideal is enough to lead to a neurosis. This may seem very plausible, but I shall be surprised if it is confirmed by future research. That a neurosis, which after all is a disorder of the unconscious imagination, should arise from a conflict between two states of mind that are fully in contact with reality would be something entirely contradictory of our past experience, as would also a neurosis arising from a conflict between two tendencies both belonging to the ego. I shall venture to put forward an alternative hypothesis presently when discussing the subject of fear, which we have next to consider.

Freud states[1] that from one point of view all psychoneurotic symptoms may be regarded as having been constructed in order to prevent the development of fear—another point of contact between his theory and the observers of war neuroses, who would surely agree that fear is the central problem they have to deal with. By fear is here meant rather the mental state of dread and apprehension, increasing even into terror, and accompanied by well-marked bodily manifestations, a state for which psychopathologists have agreed to use the term "morbid anxiety" (or, shortly, "anxiety") in a special technical sense as being the nearest equivalent of the German word *Angst*.

Morbid anxiety is certainly the commonest neurotic symptom, and the theory of its pathogenesis has been the occasion of a very great deal of investigation,[2] with, in my opinion, very fruitful results. We meet it in the form of a general apprehensiveness of impending danger and evil, as the anxiety-neurosis, and also in hysteria in the form both of apparently causeless attacks of dread and of innumerable specific phobias. In all its forms its most striking feature is the disproportion between its intensity and its apparent justification, so that it seems at first sight extremely difficult to correlate with the biological view of fear as a useful instinct that guards against danger. Practically all modern investigations into its pathogenesis agree that it stands in the closest relation with unsatisfied and repressed sexuality, and, in my judgment, the conclusion that morbid anxiety represents the discharge of repressed and unconscious "sexual hunger" is one of the more securely established in the whole of psychopathology; it is impossible here to consider the extensive evidence in support of this conclusion, and I can only refer to the published work on the subject.[1]

---

[1] Freud, op. cit., p. 470.

[2] The latest discussion of the subject will be found in Freud's "Allgemeine Neurosenlehre," 1917, chapter xxv, "Die Angst." See also his papers in "Sammlung kleiner Schriften zur Neurosenlehre," 1906, chapters v, vi, vii, and a general review of the subject in my "Papers on Psycho-Analysis," 2nd ed., 1918, chapter xxvii, "The Pathology of Morbid Anxiety."

The next question is what is the relation between morbid anxiety as seen in peace neuroses and real—e.g., objectively justified fear, as seen in various situations of acute danger and so prominently in the war neuroses. One point of connexion is the defensive character of the reaction. Morbid anxiety, as we are familiar with it in the peace neuroses, is a defensive reaction of the ego against the claims of unrecognized "sexual hunger" (*Libido*), which it projects on to the outside world—e.g., in the form of phobias—and treats as if it were an external object; it is in a word the ego's fear of the unconscious. But there appears to be an important difference between it and "real" dread in that the latter concerns only the ego itself, arises only in connexion with external danger to the ego, and has nothing to do with the desires of repressed sexual hunger. One is tempted to say that the latter (real dread) is a normal protective mechanism that has nothing to do with the abnormal mechanism of morbid anxiety. Here, however, as elsewhere, the line between normality and abnormality is not so absolute as might appear, and consideration of the matter leads one to examine more closely into the nature of real dread itself. We then see that this can be dissected into three components, and that the whole reaction is not so appropriate and useful as is commonly assumed. The reaction to external danger consists normally of a mental state of fear, which will be examined further in a moment, and in various activities suited to the occasion, flight, concealment, defence by fighting, or even sometimes by attacking. On the affective side there is to begin with a state of anxious preparedness and watchfulness, with its sensorial attentiveness and its motor tension. This is clearly a useful mental state, but it often goes on further into a condition of developed dread or terror which is certainly the very reverse of useful, for it not only paralyses whatever action may be suitable, but even inhibits the functioning of the mind so that the person cannot judge or decide what he ought best to do were he able to do it. The whole reaction of "real" fear is thus seen to consist of two useful components and one useless one, and it is just this useless one that most resembles in all its phenomena the condition of morbid anxiety. Further there is seen to be a complete lack of relation between development of dread and the degree or imminence of danger, nor does it bear any relation to the useful defensive activities. Thus, one does not flee because one is frightened, but because one perceives danger; in situations of extreme danger men very often respond with suitable measures, of flight, fight, or what not, when they are not in the least degree frightened. The inference from these considerations is that even in situations of real danger a state of developed dread is not part of the useful biological mechanism of defence, but is an abnormal response akin to the neurotic symptom of morbid anxiety.

---

[1] *See* also Stekel, "Angstzustände," 2e Aufl., 1912.

In a recent publication[1] Freud has made the striking suggestion that the developed dread sometimes found in situations of real danger is derived not from the repressed sexual hunger that is directed towards external objects, as is the case with morbid anxiety of the peace neuroses, but from the narcissistic part of the sexual hunger that is attached to the ego, and I venture to suggest that we may here have the key to the states of terror with which we are so familiar in the war neuroses. The psycho-analytic investigations of recent years have laid increasing stress on the distinction between "object-libido," the sexual impulses that are directed outwards, and the "ego-libido," the narcissistic portion that is directed inwards and constitutes self-love. There is good reason to suppose that the latter is the more primary of the two and also the more extensive—though the least explored as yet—so that it constitutes as it were a well from which externally directed sexuality is but an overflow. The analogy naturally occurs to one of the protoplasmic outpourings in the pseudopodia of the amœba, and the reciprocal relation of these to the main body seems to be similar to that between love of others and self-love. It has been known for some time that there is a limit on the part of the organism to tolerate without suffering more than a given quantity of sexual hunger in its familiar sense of impulses directed outwards, and analytic study of the psychoses, notably of paraphrenia, has shown that the same is even more profoundly true of the narcissistic sexual hunger. In both cases, before other symptoms are formed so as to deal with the energies in question and bind them, the first thing that happens is a discharge in the form of morbid anxiety, so that we reach the comforting conclusion that a normal man would be entirely free from dread in the presence of any danger, however imminent, that he would be as fearless as Siegfried; it is a gratifying thought that there seem to be many such in our Army to-day. It seems to me likely that the intolerance of narcissistic sexual hunger which leads to dread in the presence of real danger is to be correlated with the inhibition of the other manifestation of the fear instinct, with the accumulated tension characteristic of the mode of life in the trenches.

---

[1] Freud, op. cit., p. 502.

I would suggest, therefore, that investigations be undertaken from this point of view with cases of war neurosis, especially the anxiety cases. Many of the features noted by MacCurdy,[1] for instance, accord well with the picture of wounded self-love: thus, the lack of sociability, the sexual impotence and lack of affection for relatives and friends, the feeling that their personality has been neglected or slighted, that their importance is not sufficiently recognized, and so on. Perhaps a new light may also be thrown in this way on the attitude of such patients toward death. I gather that a great part of the war neurotic symptoms, and the battle dreams in particular, have been widely interpreted as symbolizing the desire to die so as to escape from the horrors of life, an interpretation that does not accord well with the equally widespread view that the fundamental cause of such neuroses is a fear of death. I greatly doubt, on the contrary, whether the fundamental attitude is either a fear of death in the literal sense or a desire for death. The conscious mind has difficulty enough in encompassing in the imagination the conception of absolute annihilation, and there is every reason to think that the unconscious mind is totally incapable of such an idea. When the idea of death reaches the unconscious mind it is at once interpreted in one of two ways, either as a reduction of essential vital activity, of which castration is a typical form, or as a state of nirvana in which the ego survives, but freed from the disturbances of the outer world.

A word in conclusion as to the therapeutic aspects of psycho-analysis in the war neuroses. Even if it were possible, I see no reason whatever why a psycho-analysis should be undertaken in the majority of the cases, for they can be cured in much shorter ways. But I consider that a training in psycho-analysis is of the very highest value in treating such cases, from the understanding it gives of such matters as the symbolism of symptoms, the mechanisms of internal conflict, the nature of the forces at work, and so on. And there is certainly a considerable class of case where psycho-analysis holds out the best, and sometimes the only prospect of relief—namely, in those chronic cases where the war neurosis proper has, by association of current with older conflicts, passed over into a peace neurosis and become consolidated as such.

---

[1] MacCurdy, op. cit., pp. 269-272.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY
J. Y. W. MacALISTER
UNDER THE DIRECTION OF
THE EDITORIAL COMMITTEE

VOLUME THE ELEVENTH
SESSION 1917-18

SECTION OF THERAPEUTICS & PHARMACOLOGY

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1918

Section of Therapeutics and Pharmacology.

OFFICERS FOR THE SESSION 1917-18.

President—

W. Hale White, M.D.

Vice-Presidents—

Robert Capes.
A. R. Cushny, M.D., F.R.S.
H. H. Dale, M.D., F.R.S.
W. E. Dixon, M.D., F.R.S.
J. Gray Duncanson, M.B.
Harrington Sainsbury, M.D.
Ralph Stockman, M.D.
F. Parkes Weber, M.D.
R. B. Wild, M.D.

Hon. Secretaries—

W. Langdon Brown, M.D.
Philip Hamill, M.D.
J. Gordon Sharp, M.D. (*Foreign*).

Other Members of Council—

William Bain, M.D.
A. J. Clark, M.D.
Douglas Cow, M.D.
George Graham, M.D.
Donald Hall, M.D.
P. P. Laidlaw, B.C.
R. W. Leftwich, M.D.
O. F. F. Leyton, M.D.
Walter Malden, M.D.
F. Ransom, M.D.
F. M. Sandwith, C.M.G., M.D.

Representative on Library Committee—

J. Gray Duncanson, M.B.

Representative on Editorial Committee—

H. H. Dale, M.D., F.R.S.

SECTION OF THERAPEUTICS AND PHARMACOLOGY.

CONTENTS.

April 16, 1918.

A. J. Whiting, M.D. PAGE

On the Comparative Value of the Digitalis Series of Remedies in the Heart Failure of Auricular Fibrillation, and the Changes in the Clinical Features of Mitral Stenosis after Fibrillation of the Auricle 1

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

London:

John Bale, Sons and Danielsson, Ltd.,

Oxford House,

83-91, Great Titchfield Street, Oxford Street, W. 1.

Section of Therapeutics and Pharmacology.

President—Dr. W. Hale White.

On the Comparative Value of the Digitalis Series of Remedies in the Heart Failure of Auricular Fibrillation, and the Changes in the Clinical Features of Mitral Stenosis after Fibrillation of the Auricle.[1]

By A. J. Whiting, M.D.

Permanent fibrillation of the auricle, involving its virtual paralysis, is a clinical condition which, thanks to the work of Mackenzie, Cushny, Lewis and others, is now widely recognized as the proximate cause of the breakdown of the heart in a particular group of cases. It is, however, only a proximate cause, for leading up to it is the damage to the auricular wall by disease, the pathological character of which, in a large number of instances, is a carditis of rheumatic origin.

Although the state of fibrillation is a symptom rather than a disease, it is a pathological condition that, in many cases, directly threatens life, and as it may be the only factor which is capable of material relief by treatment, it follows that a study of the comparative activity of remedies in the fibrillating state is of much importance. The following case is recorded, on the suggestion of Sir James Mackenzie, to illustrate the change that ordinarily comes over the clinical picture of mitral stenosis after the onset of fibrillation of the auricle.

The observations on treatment that follow represent the remedial effect of the digitalis group of substances in auricular fibrillation and the comparative activity of different members of this series in one particular case.

---

[1] At a meeting of the Section, held April 16, 1918.

Mrs. S. R., a Polish Jewess, aged 34, was seen by me in the out-patient department of the Mount Vernon Hospital, and was sent into the wards at the Hampstead hospital on April 11, 1910, first coming there under the care of Sir James Mackenzie, and later under my own care. Her principal complaint was of pain, referred to the precordial region, and of distressing shortness of breath on quite slight exertion.

The history she gave was that she had been quite well (as regards her present illness) until two years before, when she began to suffer from pain in the chest and from a constant shortness of breath, which was made worse by exertion and coughing, also of a sensation of "fullness" or oppression in the upper chest, and of a considerable degree of general weakness. She had also suffered not a little from an irritating cough, which was at times accompanied with expectoration that, however, was never blood-stained. There had never been any swelling of the feet, and she had not been confined to bed. She had slept well at night throughout, although her cough tended to keep her awake. Her appetite had been poor but the bowels regular, and there had been no vomiting.

Her previous health had been good; she had never had rheumatism nor indeed any joint pains or noteworthy sore throat, or any chorea. She had had five children, none of whom had had any illness of any significance, and there was nothing in her hereditary health tendencies of any import.

On admission to hospital on April 11, 1910, she was found to be a small but fairly well nourished woman, 4 ft. 9½ in. in height and 6 st. 3¼ lb. in weight. Her cheeks were flushed and a little cyanotic. She could lie comfortably in bed if her head were supported by not less than two pillows, but she became dyspnœic on the least exertion, the alæ nasi working. Her chest was barrel-shaped, and moved as a whole in respiration. A few crepitations were heard on auscultation of the bases of the lungs posteriorly, but there were no other abnormal physical signs in them. The walls of the arteries were not obviously thickened. The urine was acid, of specific gravity 1020, and free from albumin and sugar. The apex of the heart was in the sixth interspace a little outside the nipple line, and 4½ in. to the left of the mid-sternal line. There was a rough presystolic murmur running up to the first sound and localized just internal to the apex beat. The second sound was reduplicated, the pulmonary portion being accentuated and the aortic clear. The rhythm of the heart, except for an occasional extrasystole, was regular, it was beating at the rate of 64 times per minute. The blood-pressure was 102 mm. Hg.

The pectoral muscles of the left side and the intercostal muscles of the third, fourth, fifth and sixth spaces, in the anterior axillary line, were tender. A polygraphic tracing, taken on that date, showed a perfectly regular radial pulse (except for a few extrasystoles) and a jugular curve having a large and regularly recurring auricular wave.

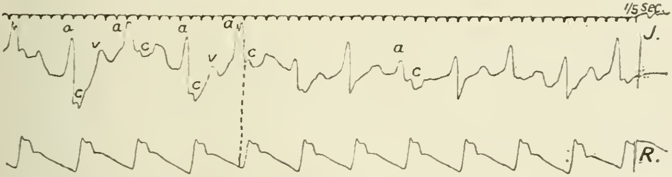


FIG. 1.

Tracings of the radial and jugular pulses before the onset of fibrillation of the auricle, the radial showing regularity of rhythm and a rate of 60 per minute and the jugular showing a large auricular wave (*a*). Taken May 19, 1910.

Admitted on April 11 she was kept at rest in bed, without other treatment, for five days. She was then given 1 dr. of the tincture of digitalis[1] each day, in divided doses, for five days without any toxic effect or pharmacological result other than an increase of extrasystoles during exertion, and, possibly, as the accompanying chart (1) shows, a very slight fall in the heart-rate. After an interval of about four weeks she was again put on digitalis tincture, 5 dr. being given during a period of five days, and again with a negative result. The heart-rate throughout her stay in hospital is represented in the chart. The blood-pressure varied between 102 and 128, but it did not appear that the medicine had any effect on it; for example, at the commencement of one period of treatment, with digitalis (the second period), it was 128, and at the end, after 5 dr. had been taken, it was only 106.

The only recognized effect of her stay in hospital on her symptoms was the disappearance of her dyspnœa and cough after a few days' rest in bed, and the occurrence of a little nausea and vomiting with some frontal headache for some hours at the end of the second period, during which 5 dr. of the digitalis tincture had been taken. The urine excretion was apparently unaffected by the treatment, it varied between 38 oz. and as little as 4 oz. in the twenty-four hours.

---

[1] *Note.*—All the doses up to page 38, being before 1914, are according to the old Pharmacopœia.

Her weight, which was 6 st. $3\frac{1}{4}$ lb. on admission, was 6 st. $8\frac{1}{2}$ lb. on discharge, a gain of $5\frac{1}{4}$ lb. The size of her liver was unchanged throughout. Although there was no alteration in the physical condition demonstrably attributable to the drug, yet she left the hospital on May 23, 1910, as the case-records state, "greatly improved." As was pointed out, the chief improvement in her comfort followed on the bed-rest before drug-treatment was commenced. As shown in Chart 1 the effect on the heart-rate of digitalis tincture in doses of 1 dr. a day was a slight reduction, followed by a slight reactionary rise—a result in conformity with pharmacological experiment.

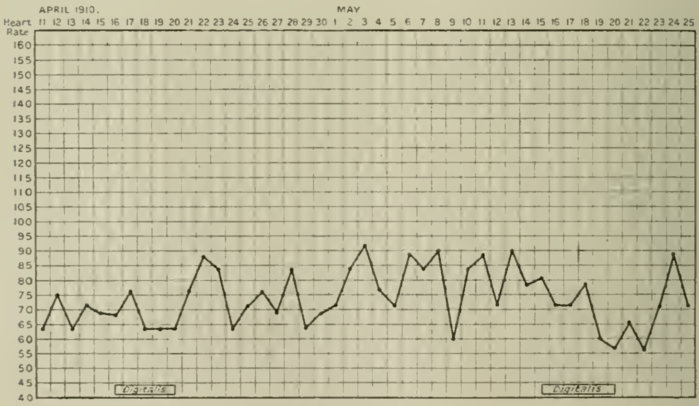


CHART 1.

Curve showing effect on pulse-rate of tincture of digitalis, in doses of 1 dr. a day, *before* the onset of fibrillation of the auricle. The first period of administration began on April 16 and ended on the 20th, and consisted of 3 dr. 45 minims; the second began on May 15 and ended on the 20th, and consisted of 5 dr.

The clinical facts of the case in this prefibrillation stage may be summarized as follows :—

(1) Cyanosis, dyspnœa, and a little precordial pain.

(2) Regular heart-rhythm.

(3) A normal heart-rate.

(4) No anasarca nor ascites.

(5) Jugular pulse wave showing large auricular wave.

(6) Rough late presystolic murmur (*crescendo* in effect) running up to the first sound and stopping abruptly.

(7) Neither heart-rate nor urine excretion affected by digitalis unless to a trivial extent.

CLINICAL CONDITION AFTER THE ONSET OF FIBRILLATION OF THE AURICLE.

After leaving hospital in May, 1910, Mrs. S. R. remained comparatively well for about seventeen months until October, 1911. Her precordial pain and difficulty in breathing then returned, she developed a wearing cough, and œdema of the feet appeared for the first time. Her symptoms becoming aggravated, she was re-admitted into the Mount Vernon Hospital on January 3, 1912.

She was then obviously very ill indeed, there was moderate ascites and œdema of the feet and legs. She was unable to lie down or even recline on account of dyspnœa, and she showed moderate cyanosis and slight jaundice. Her condition was too grave to allow of her being weighed. Very little urine was being passed. Her pulse rhythm, instead of being regular, as during the previous stay in hospital, was completely irregular, no two beats being alike, showing the characteristic irregularity of fibrillation of the auricle. The mean heart-rate was about 145. The size of the heart was increased, the apex being about 5 in. to the left of the mid-sternal line, in the sixth and seventh interspaces, and its beat was hardly perceptible by palpation. The liver was much enlarged, the lower border being palpable considerably below the umbilicus in the middle line, and there was acute tenderness of the structures over it. Auscultation of the lungs revealed râles over nearly the whole chest. Only 8 oz. of urine were passed in the twenty-four hours succeeding admission, and it contained albumin. The presystolic murmur disappeared, and instead there was a *diminuendo* murmur in early diastole (contrasting with the *crescendo* effect of the abruptly ending presystolic murmur found during the previous admission) while tracings of the jugular pulse (differing from those taken eighteen months before) showed no evidence of contraction of the auricle—there was no A wave. (*See* tracing, fig. 2.)

Following the usual procedure no medicinal treatment (except for occasional aperients) was given for several days. But under rest in bed her condition had substantially improved by the end of the second day; the ascites and anasarca had almost gone, and the breathing was quiet, so that she could lie down if her head and shoulders were supported by two or three pillows. Her colour had improved, and the secretion of urine increased from 8 oz. to 45 oz. She could now hold her breath for four seconds, which was impossible on admission, and the heart-rate was steadily falling. On January 11, the eighth day after admission, it had fallen to 90 per minute, and it remained at this level during the two following days. On January 15 she could hold her breath for seventeen seconds. Meanwhile the liver had diminished in size, the tenderness over it had disappeared, and her urine excretion was respectively 9 oz., 12 oz. and 14 oz. on January 14, 15 and 16.

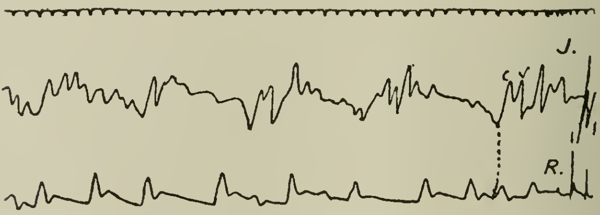


FIG. 2.

Tracings of the radial and jugular pulses after the onset of fibrillation of the auricle: the radial showing complete irregularity of rhythm and tho jugular the ventricular form of the venous pulse—absence of the normal auricular wave.

On January 16 auscultation of the heart gave a heart-rate between 80 and 90 per minute, and she felt much better. On the afternoon of January 18, however, for some unexplained reason, she became much worse. Her pulse was uncountable at the wrist, and it showed many runs of very small beats; auscultation of the heart revealed a rate of about 140. A constant harassing cough developed, the liver greatly increased in size, and there was again much tenderness over it. The breathing again became laboured. During the night she was given $\frac{1}{6}$ gr. of morphine and $1\frac{1}{2}$ oz. of brandy in divided doses, but she was no better on the following morning. The apex-beat was then extremely weak and diffuse: the outermost limit of the heart was about 5 in. to the left of the mid-sternal line in the sixth and seventh interspaces. During the course of the day her condition still further deteriorated. At 2 p.m. the heart's apex could not be localized by palpation, but by percussion it was still 5 in. to the left of the middle line. There was frequent vomiting. The liver edge reached to 1½ in. below the umbilicus in the middle line, and there was great tenderness over it. The bases of the lungs were dull on percussion, while râles and rhonchi were audible all over the chest. No tracing could be taken of the apex-beat, it was so weak, but a tracing of the epigastric pulsation gave a heart-rate of between 140 and 160 per minute from a curve recorded continuously for thirty minutes, from 2.30 to 3 p.m.

INTRAVENOUS INJECTION OF STROPHANTHIN.

At 3 p.m. on January 19, the mean heart-rate being 150, an intravenous injection of a solution of strophanthin containing $\frac{1}{100}$ gr. was cautiously and gradually given by Dr. Linnell, the actual injection taking ninety seconds from beginning to end. The solution of the drug was specially prepared for Professor Cushny by Messrs. Burroughs Wellcome and Co. from selected seeds of *Strophanthus kombé.*

At the end of ten minutes (3.10 p.m.) the heart-rate had fallen to 125, at the end of another seven minutes (3.17 p.m.) it was 110, at the end of thirty minutes from the start (3.30 p.m.) it was 80, and the bigeminal rhythm characteristic of the physiological effect of this drug-group had appeared. The apex-beat had increased and the epigastric pulsation had decreased. At the end of the first hour (at 4.6 p.m.) the heart-rate was 74 (nearly the lowest point reached), though at the end of about five hours it was still less, 72, which was the actual lowest point. At the end of seven hours (10.15 p.m.) it was 80, and at 11 o'clock next morning (January 20) it was still 80.

On the morning of January 20, some twenty hours after the injection, the liver edge had receded not less than 3 in., and the tenderness over the liver had become slight. The cough was much less, nausea had disappeared, and having slept through nearly the whole of the previous night she felt much better.

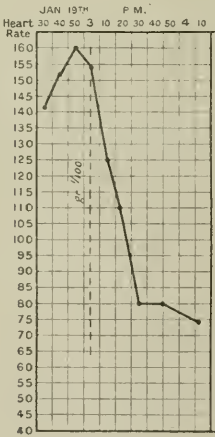
The good effect of the injection persisted for some five days; on January 21 (forty-four hours after the injection) the heart-rate was 92, the liver had shrunk so that its lower margin was apparently only a finger's breath below the margin of the ribs, and the tenderness over it had gone.

On the morning of January 22 she looked much better, but the heart-rate was now 96 per minute. On January 23 it was about the same, and on the 24th it was only 82. On the 25th it was 88, the reactionary rise having apparently spent itself, yet the tenderness over the liver was clearly returning and there was some rigidity of the upper portion of the rectus abdominis.

On January 26 the rate was 116, on the 28th it was 113, and she again looked ill, while her respiration rate was 30 per minute and the characteristic "release" cough had returned.

SECOND INTRAVENOUS INJECTION OF STROPHANTHIN.

On January 29, at 12 noon, her heart-rate had become so rapid as to be uncountable; there was considerable nausea and distressing dyspnœa. At 6.20 p.m., the heart-rate being about 145, a second intravenous injection of strophanthin was given, containing on this occasion only $\frac{1}{250}$ gr. By 12 midnight the heart-rate had fallen to 76, and her general condition was much improved. On the following morning she was obviously still experiencing the good effect of this small dose; her heart-rate was 84, but it was noticed that even slight exertion, such as that of sitting up in bed, considerably quickened the



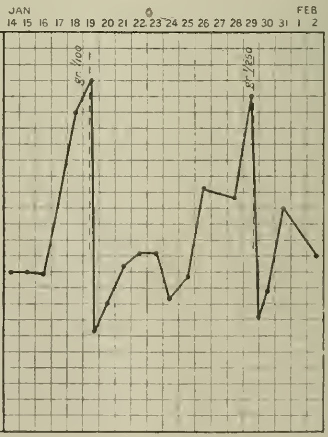


CHART 2.

CHART 3.

Chart 2.—Curve showing the immediate effect on the heart-rate (in ten-minute intervals) of the intravenous injection of strophanthin, $\frac{1}{100}$ gr.

Chart 3.—Curve showing the duration of the effect on the heart-rate (in daily intervals) of strophanthin, $\frac{1}{100}$ gr., and later of $\frac{1}{250}$ gr.

heart-rate even to as high as 140 per minute. She was, however, quite free from nausea. The effect of the drug then began to wear off; on January 31 the rate was 110 and the respiration 24 per minute. The heart rhythm was very irregular.

During February 1, 2 and 3 the heart-rate rose gradually, and on the 3rd the respiration-rate was 28 per minute.

Charts 2 and 3 show respectively the immediate effect of the injection of $\frac{1}{100}$ gr. of strophanthin, and of that of the subsequent injection of $\frac{1}{250}$ gr., and the duration of the effect of both injections.

The foregoing record may be taken as representing the emergency treatment of acute heart failure in auricular fibrillation, but further reference to it with remedies other than strophanthin will be given later. The following observations bear, however, not on the emergency treatment, but on the more deliberate treatment by the mouth with different members of the digitalis series.

The following table summarizes the salient changes in the clinical picture of this case of mitral stenosis following the onset of fibrillation of the auricle :—

TABLE OF THE CHANGES IN THE CLINICAL FEATURES OF THE CASE AFTER THE ONSET OF FIBRILLATION OF THE AURICLE.

Clinical state	Before fibrillation	After fibrillation
Outstanding symptoms ...	Cyanosis, dyspnœa, precordial pain (slight)	Great cyanosis, orthopnœa, precordial pain (severe), epigastric pain
Auscultatory signs—*bruit* ...	Rough, late presystolic murmur; staccato ending giving effect of *crescendo*	Early soft diastolic murmur; interval between end of murmur and first sound giving effect of *diminuendo*
Heart-rhythm (*see* tracings)...	Regular	Completely irregular
Heart-rate	Normal, 60 ±	Rapid, 150 ±
Œdema	None or very little ...	Considerable
Jugular pulse (*see* tracings)...	Large A wave (auricular contraction), "auricular type"	No A wave (no contraction of auricle), "ventricular" type
Effect of digitalis group on heart-rate	Trivial, if any, perhaps reduction of 10 beats or so per minute	Great slowing, to much below lowest rate of the pre-fibrillation stage, a decrement of 100 beats per minute or more
Effect of digitalis group on urine excretion	Little, if any	Considerable, varying with amount of œdema present

EFFECT OF DIGITALIS IN MITRAL STENOSIS AFTER ONSET OF FIBRILLATION OF THE AURICLE AS COMPARED WITH ITS EFFECT IN THE PREFIBRILLATION STAGE.

On February 21, the heart-rate being 110, and the rate having varied during the previous six days between 92 and 110, the effect of the previous treatment having therefore presumably passed off in a great measure at least (*vide* figs. 4, 5 and 6), tincture of digitalis was

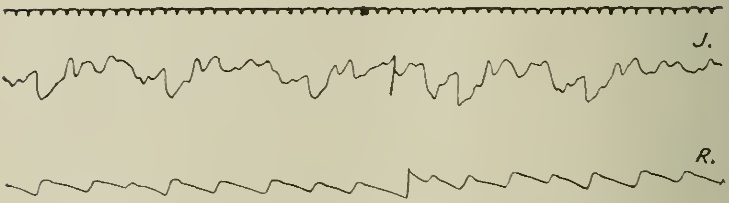


FIG. 3.

Tracings of radial and jugular pulses taken (February 17) ten days after last dose of medicine, showing pulse-rate of 92 per minute.

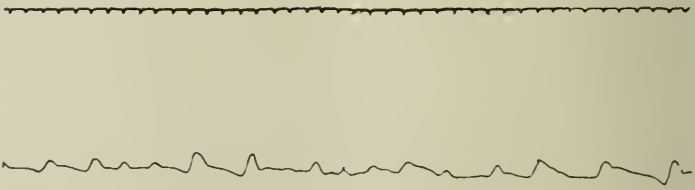


FIG. 4.

Radial tracing taken (February 21) fourteen days after last dose of digitalis, showing pulse-rate of about 110 per minute.

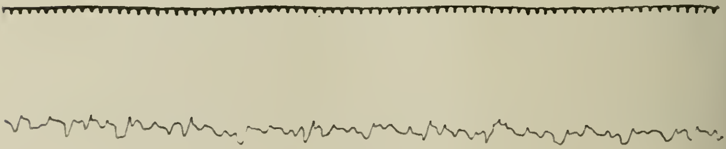


FIG. 5.

Tracing of apex-beat taken (February 21) fourteen days after last dose of medicine, showing heart-rate of about 110 per minute and small volume of the individual waves.

given in doses similar to those administered in the prefibrillation stage (a drachm a day) and for a similar number of days (*see* Chart 1). This was with the object, in part, of comparing the effect of the drug in the two stages—pre- and post-fibrillation. She was given 15 minims four times a day, the first dose being given at 6 p.m. on February 21. On the morning of February 22 the heart-rate had fallen from 110 to 92, on the 23rd it was 80, on the morning of the 25th it was 88 (a reactionary rise presumably), and on the morning of the 26th it was 66. As she was then complaining of nausea the digitalis was stopped, the last dose being given at 2 p.m., 5 dr. of the tincture having been taken in all.

During the next six days the heart-rate was about 68 per minute. The following tracing was taken on February 28, two days after digitalis was stopped.

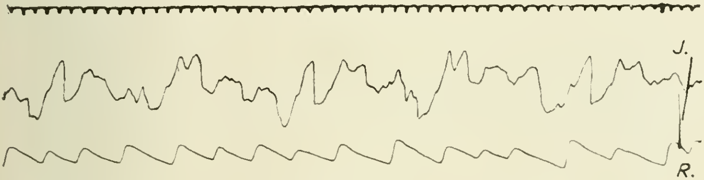


FIG. 6.

Tracing of radial and jugular pulses taken (February 28) two days after the course of digitalis tincture (5 dr.) was stopped, showing heart-rate of about 68 per minute.

On the next day, March 1, the following tracings were taken of the apex and radial, and one was taken showing that she was able to hold her breath for eleven seconds. At this date she had been off digitalis for three days.

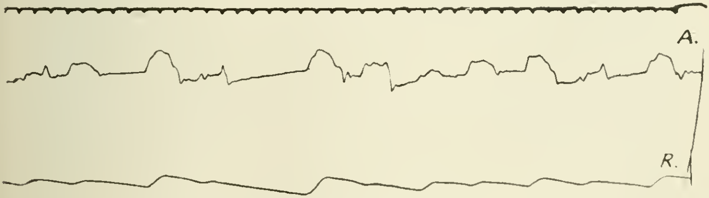


FIG. 7.

Tracings of apex-beat and radial pulse taken (March 1) three days after the course of digitalis was stopped, showing slowing in the rate (to about 68) and increase in the volume of the beats.

On March 4 (the seventh day) the heart-rate was 86.

On March 5 the heart-rate was 78, and she complained of a little shortness of breath, while there was slight tenderness in the upper abdomen.

On March 6 she was distinctly less well, there was some dyspnœa, and she complained of "pains in the stomach" which we had learned to associate with engorgement of the liver, and her cough had become troublesome, which we had also come to consider characteristic of digitalis release. Her heart-rate was 81. It was particularly observed on this date (the observation being confirmed by Sir James Mackenzie and several other competent observers) that there was no presystolic murmur as there had been, as confirmed by him and others a year before.

On March 7 her heart-rate was 96 and on the next day it was 94.

SECOND COURSE OF TINCTURE OF DIGITALIS.

On March 9 she was feeling fairly well; her cough was less troublesome than it had been, but she was still short of breath and still complained of abdominal pain. Her heart-rate was 94, and the only murmur audible on that day was a mitral systolic murmur. She was now put on 1 dr. per day doses of tincture of digitalis (after an interval of twelve days), 15 minims being given four times a day, and the first dose at 6 p.m.

On March 10 the heart-rate was 78, on the 11th it was 74 and she was again feeling comfortable. On the morning of the 13th it was 60, and she felt much better. Nausea had however commenced on the previous evening about 6 p.m., and she had vomited at 11 p.m., and again at 12 midnight. As the nausea persisted the digitalis was again discontinued, the last dose being given at 6 p.m. on March 13, making 3 dr. 45 minims in all during the course.

On March 14 the heart-rate was 58, and it was 64 on the 15th. No systolic mitral murmur could be heard, but a long-drawn-out *diminuendo* diastolic murmur nearly filling the whole diastolic period was audible. The heart's apex was 5¾ in. from the middle line and the right border 1⅜ in. to the right of it. There was no dyspnœa and no nausea.

On March 16 the heart-rate was 64, on the 17th 66, and a systolic mitral murmur had again became audible at the apex. On March 18 it was 80, but she felt well and had no dyspnœa; on the 19th it was 64, on the 20th 74, and she was feeling quite comfortable without dyspnœa even when she underwent slight exertion; the cough was only a little troublesome, and she had been getting up for two hours daily for several days without distress.

On March 21 she did not feel so well; there was some dyspnœa and a return of the characteristic short dry cough; her heart-rate was 84. On the 22nd it was 80, and there were the usual symptoms of dyspnœa, cough, heaviness and pain in the epigastrium.

On March 22 the rate was 82 and there was much cough and considerable dyspnœa. On the 24th cough was more frequent and there was dyspnœa on the slightest exertion and indeed even on reclining in bed. The cheeks and nose were congested and there was slight cyanosis. The heart-rate was 86.

On March 25 she felt fairly well, having slept well during the night; her heart-rate was 82. On the 26th she was less well again, owing to troublesome cough and pain in the epigastrium; her heart-rate was 88. On March 27 the rate was 108, there was much cough and more pain in the abdomen, the face was flushed and there was dyspnœa while at rest. It was then decided, on the suggestion of Professor Cushny and in consultation with Sir James Mackenzie, to exhibit apocynamarin.

Chart 4 shows the effect of tincture of digitalis on the heart-rate during fibrillation of the auricle, and should be compared with Chart 1, representing the effect of similar quantities during the prefibrillation stage.

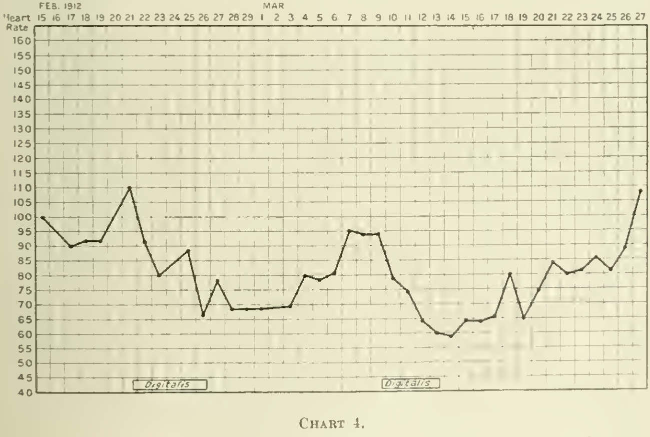


CHART 4.

Curve showing effect on pulse-rate of tincture of digitalis, in doses of 1 dr. a day *after* the onset of fibrillation of the auricle. The first period, from February 21 to 26, consisting of 5 dr.; the second, from March 9 to 13, consisting of 3 dr. 45 minims.

THE COMPARATIVE VALUE OF DIFFERENT MEMBERS OF THE DIGITALIS GROUP AND OF THEIR SUPPOSED PHARMACOLOGICAL EQUIVALENTS.

With the object of ascertaining which of the so-called "heart remedies" more generally used were especially effective in this particular case and incidentally which of them were of so little value, if any, as to be unworthy of confidence, the following observations were made with the collaboration of Professor Cushny and Sir James Mackenzie.

Apocynamarin.

The first substance to be tried was apocynamarin—the active principle of apocynum, a drug which, in the form of the tincture of apocynum, has had considerable vogue, especially in America, in the treatment of heart failure.

Treatment with apocynamarin (the specimen used being provided by Professor Cushny), was commenced on March 28 (1912) about a fortnight after the administration of digitalis was stopped. The heart-rate during that interval had risen from 58 to 108, at which point it stood on March 27. Mrs. R. had then much cough of the type characteristic in her case of digitalis-release; there was some shortness of breath, even while lying at absolute rest, her face was flushed, she had pain in the upper abdomen, as was usual when the liver had become enlarged, and she did not feel well although she had no nausea, nor had she indeed been troubled with it since the digitalis was stopped. Her urine excretion in the previous twenty-four hours was 20 oz., and her weight was 6 st. 5 lb. 6 oz.

At 10 a.m. on March 28 she was given 5 mg. of apocynamarin by the mouth. At 11.30 a.m. she began to feel sick and the nausea persisted the whole of the day. At 6 p.m. she was given another 5 mg., and at 7.45 p.m. she vomited, after which retching persisted for half-an-hour. The medicine was accordingly stopped.

On the morning of March 29 her heart-rate was the same, 100 to 108, her urine excretion during the previous twenty-four hours had been 14 oz., and there had been no nausea since the retching ceased the evening before. She complained of feeling faint and "heavy," with pain in the epigastrium, and of some shortness of breath, and cough. The accompanying tracing of the radial and jugular pulses was taken. She was fairly comfortable during the day, but about

8 p.m. she began to feel faint and short of breath again, with the usual pain in the epigastrium. On the morning of the 30th she still felt unwell, her urine excretion in the previous twenty-four hours had only been 12 oz., and her heart-rate was 100 to 110. Apocynamarin was again prescribed in doses of 1 mg., to be repeated twice every twenty-four hours, the first dose being given at 10 a.m. on the 30th. On the morning of March 31 she was still feeling faint, but had had no vomiting, nor even nausea. The urine excretion on the previous day had been 14 oz. Her heart-beat reached 110 and was very irregular in rhythm. The drug was again stopped after four doses of 1 mg. each on the 30th and 31st, the last dose being given at 6 p.m. On April 1 she was still feeling ill, with dyspnœa and her well known tight feeling in the chest, while her cough was worse. There was tenderness over the liver and her urine excretion in the previous twenty-four hours was 13 oz. The heart-rate was the same as on the previous day; the bases of the lungs were dull, with some fine crepitations audible throughout the lungs.

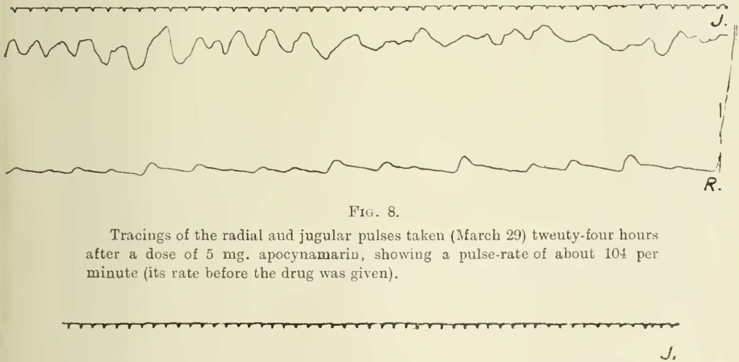


Fig. 8.

Tracings of the radial and jugular pulses taken (March 29) twenty-four hours after a dose of 5 mg. apocynamarin, showing a pulse-rate of about 104 per minute (its rate before the drug was given).

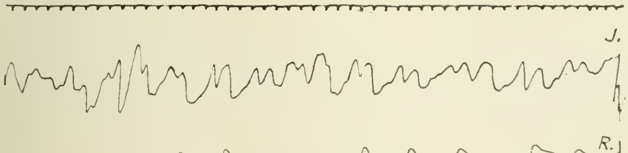


Fig. 9.

Tracings of the radial and jugular pulses taken (March 30) after two doses of apocynamarin of 5 mg. each, showing the pulse-rate the same as before the first dose of the drug.

The benefit, if any, was so slight as to be inappreciable, and the untoward effects were so obtrusive, that the drug in this form was for the time abandoned. At a later date, however, it was given again. During the succeeding forty-two hours she felt rather better, the faint feeling being definitely less. The pulse characters remained much the same until April 2, when strophanthus was commenced.

The Graduated per os Administration of Strophanthus.

Although the patient felt more comfortable on April 2 (presumably from the discontinuance of the apocynamarin) her real condition was no better, but rather worse; her heart-rate varied between 120 and 140, there was much cough, and much pain in the upper abdomen over the enlarged liver, which had reached 2 in. below the umbilicus on the previous day. Her urine excretion during the previous twenty-four hours was 18 oz.

First Course of Strophanthus.

The B.P. tincture of strophanthus was then prescribed in doses of 15 minims every six hours, equivalent, as in the case of the digitalis tincture, to 1 dr. in twenty-four hours. The first dose was given at 2 p.m. on April 2, and repeated at 8 p.m., 2 a.m. on the 3rd and 8 a.m., making 1 dr. before she was seen at 10 a.m. on that day. She then expressed herself as feeling very much better. There was no faintness, and only trivial nausea for a few minutes after each dose of medicine; she had had a good night and the lower edge of the liver had definitely receded. The urine excretion during the previous twenty-four hours had been 22 oz., and most noteworthy of all, her heart-rate had fallen to 60 per minute. The following tracings were taken at the time, April 3.

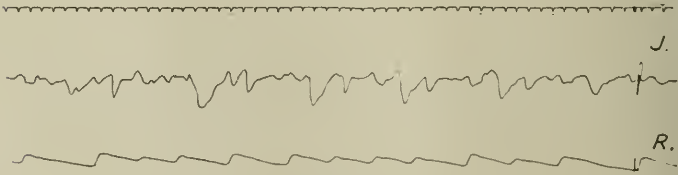


Fig. 10.

Tracings of radial and jugular pulses taken (April 3) after 1 dr. strophanthus tincture—in fifteen-minim six-hourly doses—showing a fall in the pulse-rate to 60, from 120 per minute, in the space of twenty hours.

The heart-rate therefore had fallen from 120 or over to 60 or thereabouts in about twenty hours after 1 dr. of the B.P. tincture had been taken in 15 minim doses. A fifth dose was given at 2 p.m. without any nausea being excited, and then, as it was suggested that this fall might be partly due to the apocynamarin, the strophanthin was suspended for the time. Subsequent experience, however, failed to substantiate that suggestion.

During the next nine days, while under no active treatment, the heart-rate increased (as shown in the chart) until, on April 10, it had reached 102. The dyspnœa had again become troublesome, systolic and diastolic murmurs were audible at the apex and the liver dullness had reached 1½ in. below the level of the umbilicus. On April 12 the heart-rate had reached 128, she was feeling ill with nausea and pain in the epigastrium, and that night hardly slept at all.

Second Course of Strophanthus.

She was again put on tincture of strophanthus (B.P.) in doses of 15 minims, six hourly (a drachm in twenty-four hours), the first dose being given at 2 p.m. on April 12. At 10 a.m. on the morning of the 13th, after four doses of 15 minims each (1 dr.), the heart-rate had fallen to 74 and she felt considerably better. Nausea and vomiting occurred about midnight. On the morning of the 14th the heart-rate was 56 and there was some vomiting in the evening. The menstrual period was on at this time, during which she was always much upset. The drug was therefore again stopped, the last dose being given at 10 p.m. on April 14; ten doses of 15 minims, or 2½ dr. in all, were given on this occasion. Retching was frequent during the whole of that day, and there was a little diarrhœa; she vomited for the last time at 5 a.m. on the 15th. At 10 a.m. the heart-rate was 48, and the following tracings of radial, jugular and apex beat were taken.

A noteworthy feature in regard to the apex beat was its volume; before the administration of the drug it was scarcely palpable, indeed a tracing could not be obtained except near the epigastrium, and that was a mere flicker (June 8); as the influence of the remedy manifested itself it became much more voluminous and was easily palpable and recordable in the nipple line, while the epigastric pulsation became correspondingly less.

The heart-rate on April 15 when the strophanthus tincture was stopped (after 2½ dr. had been taken during two and a half days) was 48;

on the 16th it was 66 at 10 a.m. and 82 at 2.45 p.m.; on the 17th it was 82, there was no nausea but a return of some epigastric tenderness; on the 19th it had reached 100; on the 22nd, at the same rate, a "tight feeling" in the abdomen was complained of, presumably due to re-enlargement of the liver; on the 23rd the liver was ascertained to be 2 in. below the level of the umbilicus at a point 2 in. to the right of the middle line; there was more cough and more shortness of breath. These symptoms persisted, and on the 24th, when the heart-rate was 102 and the urine excretion (which on the 22nd was 28 oz.) was now 21 oz. Tracings were taken on the 24th, ten days after strophanthus was stopped, showing a rise in heart-rate to 102 from 48 per minute.

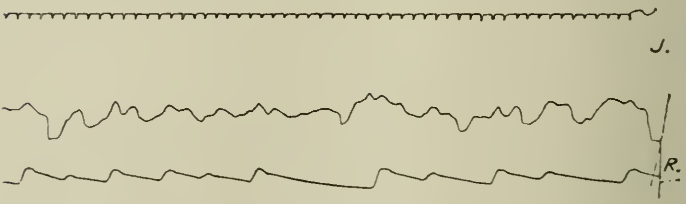


FIG. 11.

Tracings of radial and jugular pulses taken (April 15) two days twenty hours after 2½ dr. tincture of strophanthus was begun, showing fall in the pulse-rate to 48 from 128 per minute.

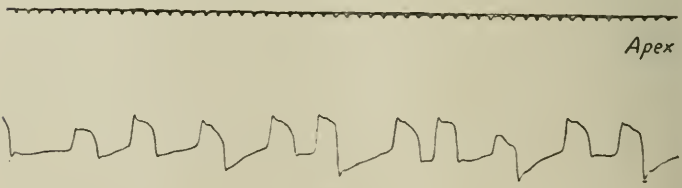


FIG. 12.

Tracing of apex-beat (April 15) at the same time as those in fig. 11, showing (e.g., as compared with that on February 21) great increase in volume.

An apex tracing was difficult to get—it was very feeble and compared remarkably in this respect with the beat on the 15th, when fully under the influence of strophanthus.

On the 25th the heart-rate was 100 (urine excretion 12 oz.) and nausea was complained of in the afternoon, although she had had no active medicine since the 14th.

On April 26 the heart-rate was 120 (urine 18 oz.); the edge of the liver was still lower than on the 23rd, nausea was persistent, and vomiting occurred at 3.30 p.m. She was very short of breath, had lost appetite for food, and her cough was troublesome in the characteristic way. It was therefore decided to put her again on strophanthus.

Third Course of Strophanthus.

On the afternoon of this day (April 26) a third course of tincture of strophanthus was commenced in the same doses of 15 minims four times a day—i.e., a drachm in twenty-four hours—but the preparation used was the 1885 tincture kindly given me for comparison by Professor Sir Thomas R. Fraser, of Edinburgh. There was much gastric irritability, apparently due to the heart condition, for several days before the drug was recommenced; indeed vomiting occurred at 3.30 p.m., half an hour before the first dose was given, at 4 p.m. on April 26; the second dose was at 8 p.m., and the third at 12 midnight. The following morning she felt better, looked brighter, and had had no nausea after 7 a.m., while the heart-rate was about 80 per minute. Tracings were taken at 10.15 a.m. on April 27, eighteen hours after the first dose, and after 45 minims in three doses had been taken, showing a heart-rate of about 80 per minute, which twenty-four hours later had fallen to 58 per minute.

What was evidently physiological vomiting due to the drug commenced about 9 p.m. on the 27th, some twenty-nine hours after the first dose, and after 1½ dr. had been taken; another dose of 15 minims was given at 10 p.m., and then the drug was stopped, making 1¾ dr. in all. The retching and vomiting lasted off and on for about eighteen hours, from 9 p.m. on the 27th to 3 p.m. on the 28th. On the 28th, at 10 a.m., the heart-rate (taken from the apex beat) had fallen to 58. On the morning of the 29th it was 72; she was feeling better in every way; the liver edge was only ½ in. below the umbilicus, 2 in. to the right of the middle line—it had receded 1½ in., and there was no systolic murmur to be heard at the apex.

It was several times observed that when the heart was fully under the influence of a drug of the digitalis type no systolic mitral murmur was audible, but when release occurred it re-appeared. Tracings were taken on the morning of April 29, showing an improvement in the character of the radial pulse and a striking change for the better in the apex-beat.

On April 30 the patient felt "very much better." It was noticed that the systolic mitral murmur had returned. The heart-rate was 84. On May 1 it was 90, and remained at that level (*vide* Chart 5) until May 4, when the urine excretion was 30 oz. She then (after having had no active treatment for eight days, since April 27, at 10 p.m., when the strophanthus was stopped) complained of not feeling so well, with the old symptoms of tightness in the chest, pain in the pit of the stomach, and between the shoulder blades. On May 5 the characteristic cough appeared, and her heart-rate was 106. Next day she was very short of breath and the cough was more frequent; the liver was 2 in. below the level of the umbilicus and the heart-rate was 120, the urine excretion being 11 oz. On May 7 the heart-rate was 130, she had the yellow colour of her face, with a purplish red flush over the malar bones, characteristic of her state, frequent cough, loss of appetite,

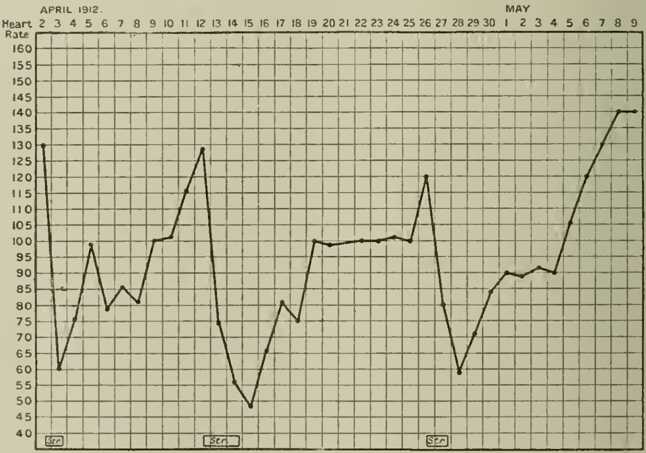


CHART 5.

Curve showing effect on pulse-rate of tincture of strophanthus, in doses of 1 dr. a day, during fibrillation of auricle: first period, April 2 to 3 (1 dr. 15 minims); second, April 12 to 14 (2 dr. 30 minims); and third, April 26 to 27 (1 dr. 45 minims).

nausea, with some retching (since May 3), and troublesome dyspnœa, made worse by the slightest exertion. Her urine excretion was 11 oz., and her temperature, as during the previous three or four days, was subnormal. On May 8 and 9 the heart-rate had risen to 140 or a little over. The liver was a little more than 2 in. below the umbilicus, and the urine excretion was only 10 oz. She had then been off strophanthus for twelve days. Chart 5 shows the effect on the heart-rate of three courses of tincture of strophanthus and the rapidity of release.

The Administration of Apocynum Tincture and Apocynamarin.

Our unfavourable impression of the utility of apocynamarin, *by the mouth*, in this case was no bar, it was felt (but rather the reverse), against the employment of the tincture of apocynum. On May 9 it was therefore decided to exhibit this preparation of the drug. The heart-rate at 10 a.m. was 140 or over, the patient stated that she felt "very bad," there was almost incessant cough, with much dyspnœa, and the usual complaint of pain and tightness referred to the epigastrium. The dosage first employed was 20 minims of the tincture five times in the twenty-four hours, making 100 minims daily. The first dose was given at 8.30 a.m. on May 9. At mid-day the following tracings were taken :—

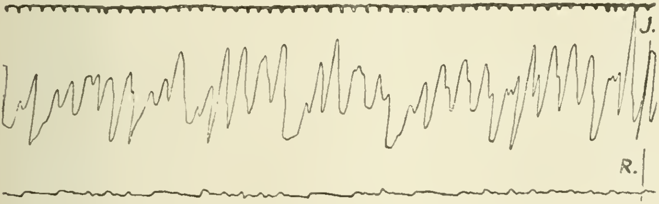


Fig. 13.

Tracing of radial and jugular pulses taken (May 9) at the beginning of administration of apocynum tincture (i.e., three and a half hours after first dose of 20 minims), showing pulse-rate of about 140 per minute ; also large jugular and small radial pulsations.

About 4 a.m. the following day (May 10) she began to feel better; the nausea and occasional retching which had been present since May 3 had ceased about 6 p.m. on the previous evening. At 10 a.m. the heart-rate was 100, she was feeling easier, the epigastric pain was much less, she was not so short of breath, indeed she had obviously improved, and there was little if any evidence of distress in her expression. The urine excretion was 16 oz. On May 11, having slept well during the night, she was feeling much better, the cough was less, the epigastric pain even less than on the previous day, the breathing was easier and there had been no retching nor nausea since May 9. Her heart-rate was 72, and the urine excretion 17 oz. The following tracings were taken on May 11, after 3 dr. 40 minims of the medicine had been taken. The radial pulse was clearly bigger, the jugular smaller, and the heart rhythm more regular.

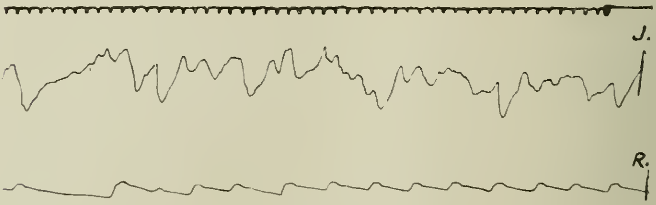


FIG. 14.

Tracings of radial and jugular pulses taken (May 11) fifty hours after commencement of apocynum tincture (3 dr. 40 minims, in doses of 20 minims having been taken), showing fall in pulse-rate to 72 (from 140 per minute) and decrease in volume of jugular pulse and increase in volume and regularity of radial.

On May 12 she complained of feeling "very heavy," there was much cough and some white frothy expectoration. Her heart-rate was 82, her urine excretion 18 oz., and her temperature 99·8° F. On the 13th her heart-rate was 72, her temperature 99·6° F., and her urine excretion 30 oz. Her condition was as on the previous day with more shortness of breath and some loss of appetite. There were crepitations at both bases but not dullness; there was some epigastric tenderness; the liver was at the level of the umbilicus 2 in. to the right of the middle line, and 1 in. above the umbilicus in the middle line. There was at the time an epidemic of "colds" in the ward. On the afternoon of May 13 the dose of apocynum tincture was increased to 30 minims, five times daily, making $2\frac{1}{2}$ dr. *per diem*, the first dose, as increased, being given at 4.30 p.m.

On May 14, at 10 a.m. she felt better, although her heart-rate was 94. Her urine excretion was 32 oz. On the 15th she felt much better. There was still some cough but less, and she felt "full in the stomach." Her temperature was now 96·6° F., her heart-rate 80, and her urine excretion 31 oz. On the 16th her heart-rate was 70, her urine excretion 44 oz., and she complained of some pain in the small of the back. Her liver dullness was as on the 13th. On the 17th she was looking and feeling very much better, though she still complained of "fullness in the stomach" and of pain in the back. There was no nausea. The heart-rate was 70 and the urine excretion 25 oz. On the 18th the heart-rate had fallen to 66 (from 140 when the drug was begun), and the urine excretion was 30 oz. The pain in the back and the "fullness" in the stomach were less, expectoration was much less; there was no nausea but she had some headache throughout the day. There was no dyspnœa. The systolic mitral murmur had again disappeared.

The medicine was now increased to 1 dr. four times daily after food, making ½ oz. *per diem.* The first increased dose was given at 12.30 p.m. on May 18. On May 19 she had a little headache throughout the day; her urine excretion was 17 oz. She had no nausea, but she vomited at 6 p.m. The 8.30 p.m. dose was omitted, making the total quantity of medicine for that day 3 dr. On May 20 the 8.30 a.m. dose of 1 dr. was omitted. Her heart-rate was 72, her urine excretion was 17 oz., and she was feeling well. At 4 p.m. she was feeling very well, without pain or "fullness" in the stomach or nausea or dyspnœa. About an hour after the 5 p.m. dose of 1 dr. she complained of nausea, and vomiting occurred at 6.30 p.m., and at 9 p.m. (after the 8.30 p.m. dose). On the 21st her heart-rate was 68, and her urine excretion 14 oz. No systolic murmur was audible at the apex. She had nausea and some retching during the morning, and after the 2 p.m. dose of 1 dr. the tincture of apocynum was discontinued. On the 22nd her heart-rate was 68 and the urine excretion 18 oz. She was feeling "much better." The liver dullness was as before, there was only trivial epigastric tenderness and no dullness at the bases of the lungs, and only a very few crepitations.

On the morning of May 23 the heart-rate was 66, and the patient was looking really very well. About 10 a.m. she was suddenly seized with violent generalized abdominal pain, without rigidity or tenderness. She vomited twice and was given brandy, and later 15 minims of laudanum and ½ oz. of castor oil. Her pulse was slow throughout the attack, and the pain became much less after the second vomiting. On the 24th the heart-rate was 84. She was feeling better again, there was no nausea, and her breathing was comfortable; urine excretion

12 oz. On the 25th the heart-rate was 84, urine excretion 15 oz., and she had slight pain in the abdomen. On the 27th the heart-rate was 90, urine 11 oz.; on the 28th it was 104, and urine was 19 oz.; on the 29th it was 104, urine 6 oz., and she felt "bad," with pain and tightness referred to the pit of the stomach, dyspnœa, cough, and occasionally a little nausea. The liver dullness was 1 in. below the level of the umbilicus, 2 in. to the right of the middle line. The following tracings were taken:—

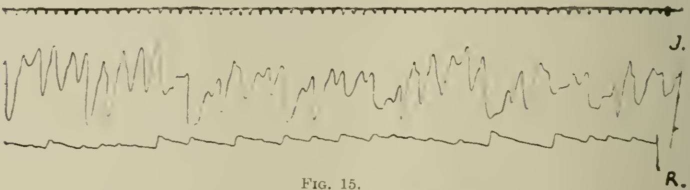


Fig. 15.

Tracings of radial and jugular pulses taken (May 29) eight days after apocynum tincture was stopped, showing rise in pulse-rate to 104 (from 68 on May 21), also increase in volume of jugular pulse.

At 10 p.m. she again complained of severe pain in the abdomen (she had had no active medicine for nine days—since May 21 at 2 p.m.). She looked very ill and distressed, had dyspnœa and cough, and there was acute tenderness over the liver. Her heart-rate was 134 or a little over (*vide* Chart 6).

Apocynamarin was again prescribed, 1 mg. being given four times daily in an alkaline mixture. The first dose was given at 11.30 p.m. on the 29th; half an hour later she vomited; the dose was repeated on the 30th at 7.30 a.m., 12 noon, 4 p.m., and 6.45 p.m., and she vomited at 8.30 a.m. and 7.30 p.m. The heart-rate remained about 140, and there was much nausea. Urine excretion on the 30th was 10 oz. The apocynamarin (1 mg.) was repeated on the 31st at 7.30 a.m., 12 noon, and 4 p.m., making 8 mg. in all, and was then discontinued.

On May 31 her heart-rate was 140 or a little over, as on the previous day, the rise from 105 having occurred in spite of the administration of apocynamarin in doses amounting to 4 mg. a day for two days. She vomited at 4.30 p.m. on the 31st, and again at 7.30 p.m., 11 p.m., and 12 midnight. The urine excretion was 9 oz., and her liver dullness reached to 2 in. below the umbilical level, 2 in. to the right of the middle line. The last dose of apocynamarin was at 4 p.m. on the

31st. It was then decided to give her tincture of strophanthus in divided doses, amounting to 2 dr. in the twenty-four hours. The effect of the two preparations on the pulse-rate is shown in Chart 6.

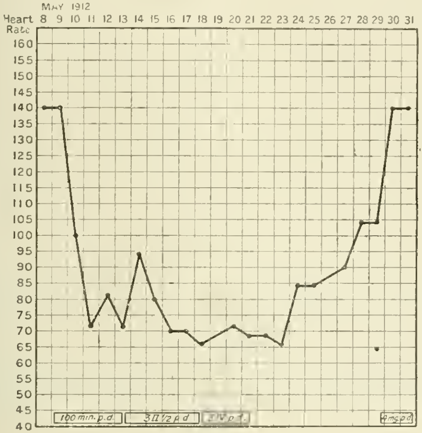


CHART 6.

Curve showing effect on pulse-rate of tincture of apocynum, continuously administered in doses increasing from 100 minims to 4 dr. a day (after the onset of fibrillation of the auricle); also the negative effect of apocynamarin (8 mg.): first period, May 9 to 13 (100 minims a day, 7 dr. in all); second, May 13 to 18 (2½ dr. a day, 11½ dr. in all); third, May 18 to 21 (4 dr. a day, 11 dr. in all).

Administration of Tincture of Strophanthus amounting to 2 dr. in twenty-four hours in 20 minim doses.

With the heart-rate standing at 140, or over, for forty-eight hours, and two hours after 8 mg. of apocynamarin had been given (in four hourly doses of 1 mg. each) without any effect on the rate, 20 minims of tincture of strophanthus were given at 6 p.m. on May 31 and instructions were given that this dose was to be repeated every four hours, making 2 dr. in twenty-four hours. She vomited on June 1 at 1 a.m., 2 a.m., 4 a.m., and 7 a.m., an effect presumably of the apocynamarin for the most part at least. At 10.30 a.m. on June 1 she was resting quietly and except for a little nausea and occasional slight vomiting was comfortable. At 12 noon her heart-rate was 48, and the following tracings were taken:—

The strophanthus tincture was stopped at 6 p.m. on June 1, she having had 2 dr. in twenty-four hours and 2 dr. 20 minims in all.

On June 2 she was feeling distinctly better, without any nausea or vomiting. Her heart-rate was 76 and urine 17 oz. On the morning of June 3 her heart-rate was 96 and the urine excretion was 14 oz. At 4 p.m. she began to complain of heaviness in the chest, there was some dyspnœa and cough but no abdominal pain.

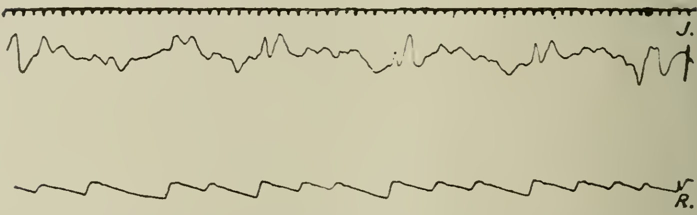


Fig. 16.

Tracings of radial and jugular pulses taken (June 1) eighteen hours after first 20-minim dose of tincture of strophanthus (1 dr. 40 minims having been taken in that time), showing a fall in the heart-rate to 48 (from 140 some eighteen hours before).

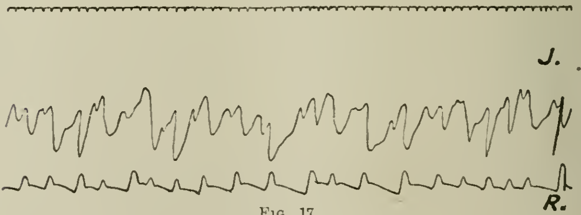


Fig. 17.

Tracings of radial and jugular pulses taken (June 8) seven days after discontinuance of strophanthus tincture in quantity equal to 2 dr. in twenty-four hours (2 dr. 20 minims in all), showing a heart-rate of 90 per minute, and a voluminous jugular pulse.

From June 1 to June 10 she had no active medicine. On June 4 the heart-rate was 90 and urine 16 oz., and subjectively she was as on the previous day. On the 5th the heart-rate in the morning was 84 and the urine 18 oz. At 1.40 p.m. she was feeling again "very heavy in the chest," with some cough and dyspnœa, but had no pain or nausea and was looking bright. On June 6 the heart-rate was 84, urine 25 oz.; on the 7th, 104 or a little more and urine 30 oz. At 3.30 p.m. she was very short of breath and "tight in the chest," with more cough but no pain nor nausea. On June 8 the heart-rate was 90, urine 24 oz. She was feeling rather better, with less cough and dyspnœa, but still much tightness in the chest. The following tracings were taken after an interval of seven days after the last dose of strophanthus (2 dr. in twenty-four hours) and Chart 7 shows the effect on the pulse-rate.

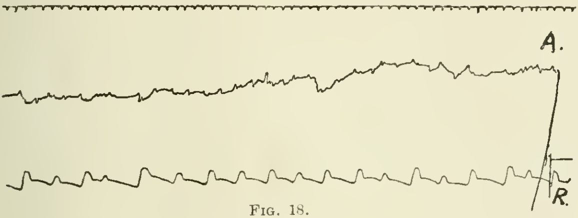


FIG. 18.

Tracings of apex-beat and radial pulse taken on same date (June 8), showing a small apex-beat which may be compared with that taken on April 15 when definitely under the influence of strophanthus.

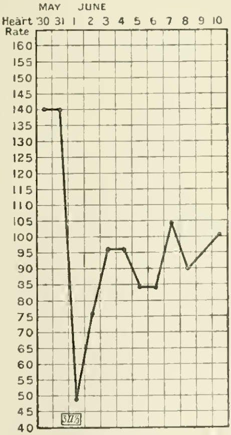


CHART 7.

Curve showing the effect on the pulse-rate of 2 dr. 20 minims of strophanthus tincture (in seven four-hourly doses of 20 minims each), after onset of fibrillation of the auricle.

Massive Single Doses of Tincture of Strophanthus.

So far the maximum dose of tincture of strophanthus given had been 20 minims, repeated every four hours for twenty-eight hours on May 31 and June 1, amounting in all to 2 dr. 20 minims. Now it was decided to give a somewhat larger dose of 30 minims, which was not to be repeated, so that the immediate effect of that quantity and the duration of its effect might be ascertained.

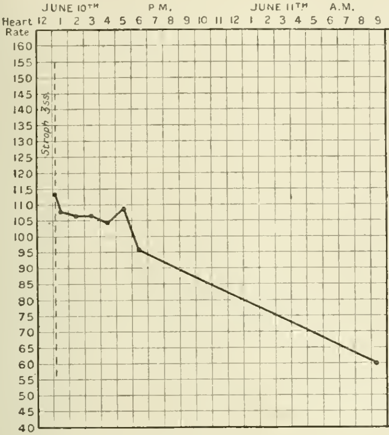
On June 10, no strophanthus having been given, or other active treatment, since June 1, the patient was feeling ill, was short of breath, complained of a sensation of oppression, referred to the chest, but had only very little and occasional nausea. The urine excretion was 18 oz. A continuous pulse tracing was commenced at 12.30 p.m. and continued until 1 p.m. At 12.40 p.m., ten minutes after it was commenced, *a single dose of 30 minims of the B.P. tincture of strophanthus*, in water, with 30 minims of the compound tincture of cardamoms, was given immediately before a meal. The pulse tracing was continued for twenty minutes after the dose. From 12.55 onwards the patient was looking distinctly better. The actual pulse waves of the tracing during the ten minutes preceding the dose were counted in half minute intervals and the average rate during that time was found to be 113 per minute. The average rate during the next twenty minutes was 107. After that, continuous tracings for the space of ten minutes were taken at 2, 3, 4, 5 and 6 p.m., and the average rates at the respective hours were 106, 106, 104, 108 and 96. At 5.15 p.m. on June 10, about four and a half hours after the single dose of 30 minims, tracings were taken showing a heart-rate of about 100 per minute, as compared with 113 per minute.

At 9 a.m. on the following morning (June 11) the heart-rate counted by the auscultation method was 60.

It should be noted that whereas the daily urine excretion during the week preceding the ½ dr. dose was 20 to 30 oz., on the day following it the excretion was 47 oz.

Charts 8 and 9 show respectively the immediate effect of the 30 minim dose on the heart-rate in hours and the duration of the effect in days.

On June 16 the heart-rate had risen to 100 per minute or a little over and the urine excretion was 30 oz. The patient made no complaint, and on the 17th she was still feeling well. It was then decided to give her a *single dose of 1 dr. of the tincture of strophanthus ;* tracings were



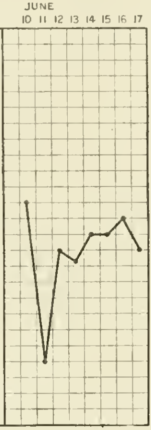
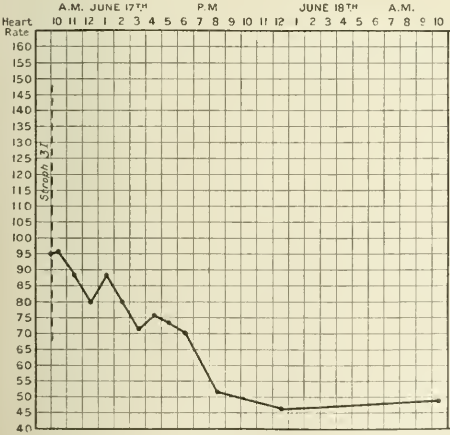


CHART 8.

CHART 9.

Chart 8.—Curve showing immediate effect on pulse-rate (in hourly periods) of ½ dr. strophanthus tincture, in single dose.

Chart 9.—Curves showing duration of the effect (in daily periods).



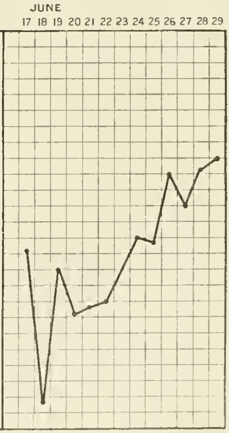


CHART 10.

CHART 11.

Chart 10.—Curve showing immediate effect on pulse-rate (in hourly periods) of 1 dr. strophanthus tincture, in single dose.

Chart 11.—Curve showing duration of effect of same (in daily periods).

taken immediately before it was given showing heart-rate of 95 per minute. The dose was given with 1 dr. of the compound tincture of cardamoms and water to 1 oz. at 9.55 a.m. Five minutes later it was 96; at 11 a.m., 88; at 12 noon, 80; at 1, 88; at 2, 80; at 3, 72; at 4, 76; at 5, 74; at 6, 70; at 8 a.m. next morning it was 52; at 10 a.m., 48; and at 12 noon it was 46. Severe vomiting started at 12 midnight (fourteen hours after the dose) and lasted till 10 a.m., but she had some nausea up to 7 p.m. The following charts (10 and 11) show the immediate effect of the dose and the duration of its influence; and the tracings of the radial pulse for half-minute periods (marked by the gaps in the time record) show the changes in the rate. (The observations on the heart-rate at 8 p.m. of 52, and at 12 midnight of 46, were made by Dr. J. W. Linnell, by auscultation of the heart.)

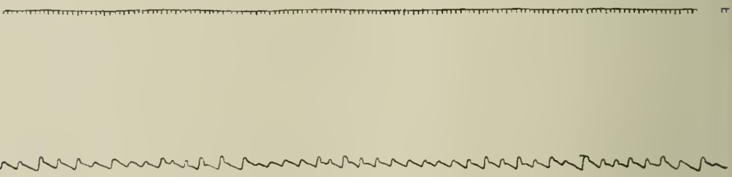


Fig. 19.

Tracing of radial pulse taken (June 17) 10 a.m. immediately after dose of 1 dr. strophanthus tincture, showing pulse-rate of 96 per minute (48 in the half minute).

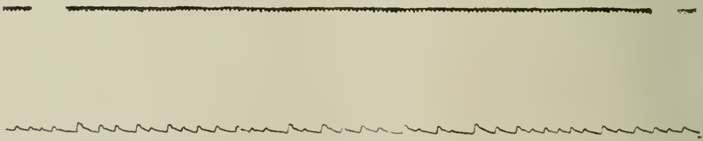


Fig. 20.

Tracing of radial pulse taken (June 17, 6 p.m.) eight hours after dose of 1 dr. tincture of strophanthus, showing fall in rate to 70 (35 in the half minute) from 96 per minute.

From June 19 to June 24 the patient felt very well and the heart-rate varied from 76 to 100. On June 25 she complained of some pain in the right hypogastrium and the heart-rate was 98. On the 26th it was 120 per minute. On June 27 the heart-rate was 110, the urine excretion 16 oz.; she was not looking so well and complained of abdominal pain. On June 28 it was 120 or a little over, the urine was 12 oz., and "crackles" were audible over the lower two-thirds of the lungs and especially at the bases.

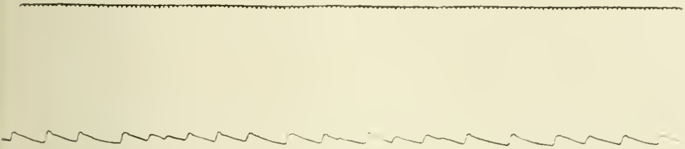


FIG. 21.

Tracing of radial pulse taken (June 18 at 10 a.m.) twenty-four hours after dose of 1 dr. strophanthus tincture, showing fall in rate to 44 (22 in the half minute) from 96 per minute.

Massive Single Dose of Tincture of Digitalis.

On June 29 it was evident that the effect of the previous doses of tincture of strophanthus had completely passed off, after an interval of twelve days from the later dose of 1 dr. She was looking ill and her complexion had the characteristic yellow tinge. During the previous week her average daily urine excretion was 17 oz. and on the 29th it was only 10 oz. It was now decided to give her a *single dose of 1 dr. of the tincture of digitalis.* Her condition immediately before the dose was given was as follows: Her heart-rate reached sometimes 130 per minute and the rhythm was absolutely irregular. She complained of the usual tight feeling in the pit of the stomach, also of pain in the right shoulder and at the bottom of the back. She was a little short of breath, although recumbent, and she needed five pillows under her head and shoulders for comfort. She had a little cough as heretofore and her sleep was disturbed. There was no nausea nor œdema. There was a little congestion of the veins and the nose was a little red with a tinge of cyanosis. Percussion of the heart's dullness showed that the right border was 1½ in. to the right of the mid-sternal line, the apex 7½ in. to the left of the middle line, and the longest diameter from right base to apex 11½ in. The liver dullness measured 10 in. in maximum vertical diameter and it reached 2 in. below the umbilicus, 2 in. to the right of the middle line and 1 in. below in the middle line. Auscultation of the heart revealed a long, soft, blowing systolic murmur at the apex and a short diastolic murmur. The following tracings were taken:—

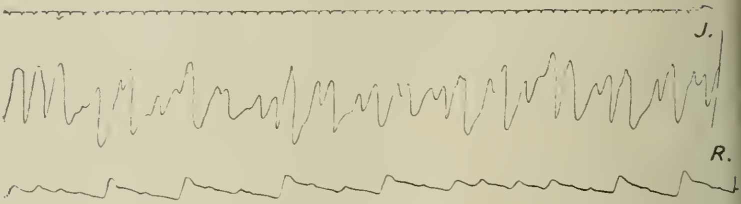


FIG. 22.

Tracings of radial and jugular pulses taken (June 29 about 11.30 a.m.) immediately before single dose of 1 dr. digitalis tincture, showing the radial pulse small and the jugular large in volume.

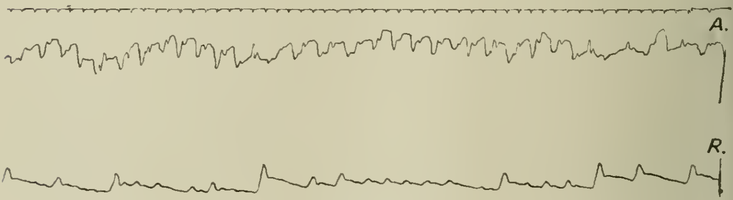


FIG. 23.

Tracing of apex-beat and radial pulse taken (June 29, 11.30 a.m.) immediately before 1 dr. digitalis tincture.

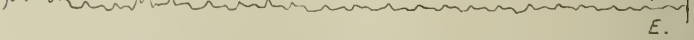


FIG. 24.

Tracings of apex-beat to the extreme left of the cardiac impulse and of the right heart in the epigastrium.

A pulse tracing for the rate was commenced at 11.55 a.m. and taken continuously for ten minutes—the average of twelve periods of thirty seconds each was 117 per minute; the tracing, as below, registered 57 in the half-minute.

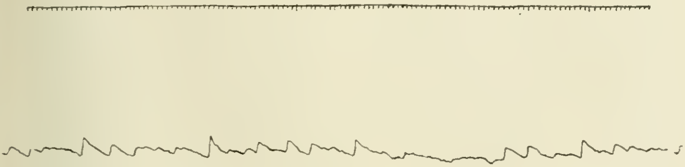


FIG. 25.

Tracing of radial pulse taken (June 29, 11.55 a.m.) immediately before single dose of 1 dr. tincture of digitalis, showing rate of 114 per minute (57 in the half minute), the average rate during ten consecutive minutes being 117 per minute.

The dose of 1 dr. tincture of digitalis was given at 12.5 p.m. The following tracings illustrate the changes in the rate and character of the pulse and jugular wave. At 2 p.m. the rate was 113; at 3 p.m., 108; at 4 p.m. it was 86 (tracing appended); at 5 p.m. it was 76; at 6 p.m., 74 (tracing appended); at 7 p.m. it was still 74; at 8 p.m. it was 78, and it was 74 at 10 a.m. next morning and this rate was the lowest limit reached. At 12 noon on June 30, twenty-four hours after the dose was given, the heart-rate was 75 per minute—being the average obtained from fourteen half-minute periods, varying from

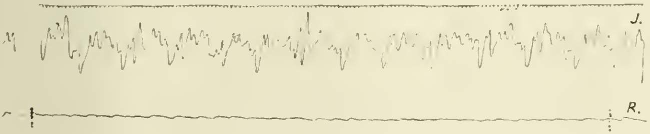


FIG. 26.

Tracings of radial and jugular pulses taken (June 29 at 4 p.m.) four hours after dose of 1 dr. digitalis tincture, showing fall in rate to 86 (43 in the half minute) from 117 per minute at noon.

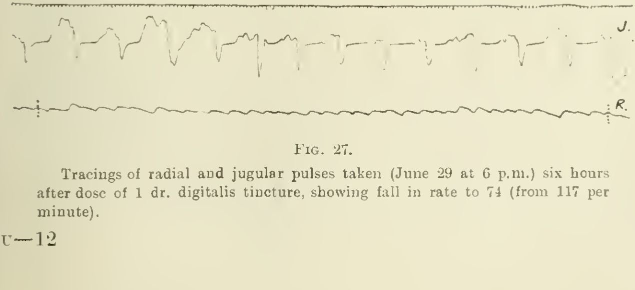


FIG. 27.

Tracings of radial and jugular pulses taken (June 29 at 6 p.m.) six hours after dose of 1 dr. digitalis tincture, showing fall in rate to 74 (from 117 per minute).

45 to 34. From 1 p.m. to 5 p.m. on June 29 there was nausea, and vomiting occurred between 2 and 2.15 p.m. At 11.30 on the morning of June 30 the following note was taken: "Feeling much better this morning, indeed began to feel better about 5 p.m. yesterday. Tightness and pain in epigastrium, also pain in right shoulder, much less. Still pain as before at the bottom of the back. Shortness of breath rather less. Cough much less. Slept well last night. No nausea this morning" (none since 5 p.m. on the 29th). "Better colour, little if any yellowness." From percussion it appeared that the apex had come in ½ in., the right border of the heart was as on the day previous before the digitalis was given. The vertical liver dullness, now 8 in. or rather less, had diminished by 2 in. The tenderness over the liver was nothing like so great as yesterday. There were still systolic and diastolic mitral murmurs audible, but the systolic was less blowing and not so long, the diastolic was shorter and rather rougher than yesterday. The following tracings were taken:—

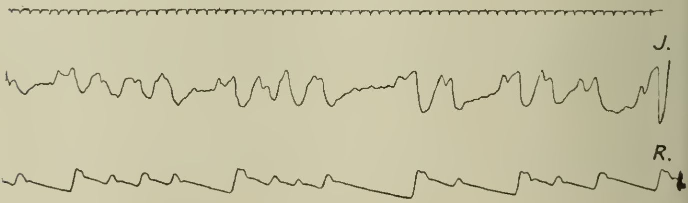


Fig. 28.

Tracings of radial and jugular pulses taken (June 30) twenty-four hours after single dose of 1 dr. tincture of digitalis, showing a pulse-rate of 75 per minute, with smaller jugular and larger radial pulsations (cf. fig. 22, p. 32).

Other tracings showed that as the heart came under the influence of the drug the apex-beat proper becomes more powerful, but the epigastric pulsation less so, and the curve characterless, and simultaneously the jugular pulse less ample and the radial pulse more so.

At noon on July 1, forty-eight hours after the dose of 1 dr. of digitalis tincture was given, the heart-rate was 86 (clearly rising again). On the whole the patient was feeling better, but she was beginning again to feel the sensation of tightness in the chest. There were still some dyspnœa, cough, and pain in the epigastrium—no less than yesterday. There was no nausea. She had slept well during the previous night and was generally of a better colour and brighter. The long diameter of the heart's dullness had receded by another ½ in., being 9½ in., as compared with 10½ in. before the dose was given and 10 in. twenty-four hours later. The right border had come in ¼ in. since the previous day. The vertical liver dullness had diminished by about ½ in., but the tenderness over the liver had not appreciably changed. Both murmurs were still audible, the diastolic being longer and rougher and the systolic shorter and rougher. The following tracings were taken :—

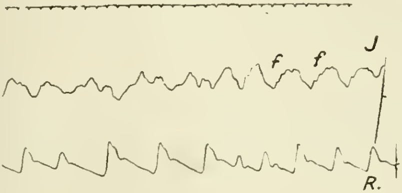


FIG. 29.

Tracings of jugular and radial pulses taken (July 1) forty-eight hours after a dose of 1 dr. digitalis tincture (the jugular pulse showing fibrillation waves, *f*) to compare with fig. 22, showing large radial and small jugular pulses.

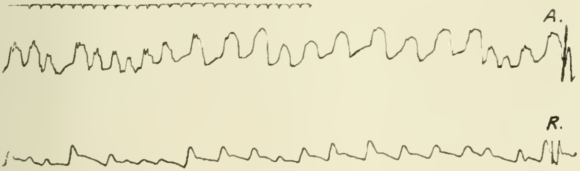


FIG. 30.

Tracings of apex-beat and radial taken at same time to compare with fig. 23.

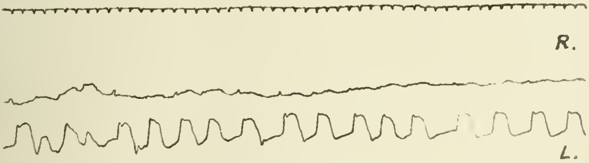


FIG. 31.

Attempted tracing from epigastrium (R) and of apex-beat, extreme left (L), to compare with fig. 24, p. 32.

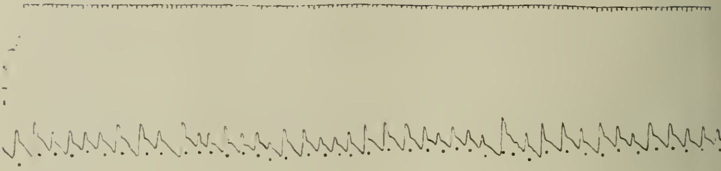


Fig. 32.

Tracing of radial pulse (July 1) forty-eight hours after dose of 1 dr. digitalis tincture giving 43 for one half-minute period; 86 was the average rate of many such periods, a rise in rate from 74, the lowest limit.

On July 2 the heart-rate was 82 and the urine excretion 36 oz. She was "not feeling much better." On July 3 the rate was 96 and the urine 26 oz., and she complained of "tightness in the stomach." On the 4th it was 82 and she felt "much better"; urine excretion was 40 oz. On the 5th it was 88; she was feeling "better," urine 24 oz. On the 6th the rate was 82 and the urinary excretion 20 oz.; she felt well, was sleeping well, and was allowed to get up in the afternoon. On July 7, 8 and 9 the heart-rate was respectively 82, 92 and 84. Whereas the average daily excretion of urine during the week before the dose was 17 oz., during the week following it was 27 oz. On July 10 the heart-rate was 90, and though feeling well she began to have again a little pain in the epigastrium. The following tracings were taken, and Charts 12 and 13 show the immediate and remote effect on the pulse-rate.

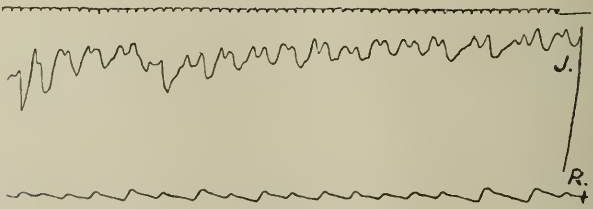


Fig. 33.

Tracings of radial and jugular pulses taken (July 10) eleven days after single dose of 1 dr. digitalis tincture, showing heart-rate of about 90 per minute, a rise of 16 beats from lowest point (74).

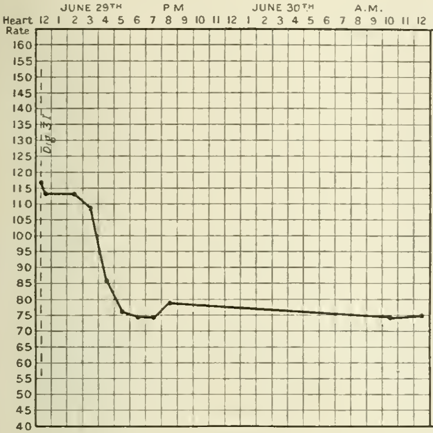


CHART 12.

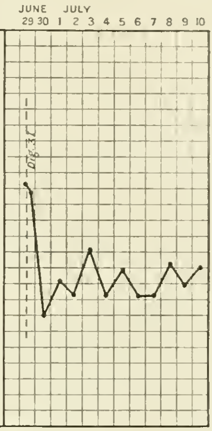


CHART 13.

Chart 12.—Curve showing immediate effect on pulse-rate (in hourly periods) of 1 dr. digitalis tincture, in single dose.

Chart 13.—Curve showing duration of effect of same (in daily periods).

Optimum Dose of Tincture of Digitalis.

On July 10, with a heart-rate of 90, the patient was beginning to complain of a little pain in the epigastrium, a complaint one had learned to associate with some enlargement of the liver following on digitalis-release. On the 11th it was 88, and after exertion (walking from the ward along a corridor to a consulting room door, perhaps 20 yards and back) it rose to 98. She was then put on tincture of digitalis in what was considered might be the minimal efficient dose—7 minims three times a day after meals, the first dose being given at 10 a.m. on that day (11th). On July 12 the heart-rate was 82, and 100 after exertion: on the 13th, 80 before and 98 after exercise; on the 15th, 80 before and 88 after; on the 16th, 56 and 72 respectively; and on the 17th, 68 and 80. The urine excretion during that week averaged 20 oz. She was discharged as fit for home treatment on July 17 (1912).

OTHER REMEDIES EMPLOYED.

Since that date, up to the time of her death at the end of 1916 or the beginning of 1917, she was kept under observation, having been in hospital several times under my care in the Prince of Wales's General Hospital. Generally speaking her heart condition seemed to improve, except for the circumstance that when heart-failure occurred from time to time (after an influenzal or other infection or from some other cause) dropsy was a more conspicuous feature than formerly, even extending to the upper limbs, though it was never extreme in amount, and she died in such attack after being under observation and treatment for seven years.

While in hospital she was given at one time or another spartein sulphate and tincture of squill alternately with strophanthus or digitalis, with or without diuretin. While the beneficial influence of spartein was inappreciable, under the influence of tincture of squill in doses of 1½ dr. daily there appeared to be but little reduction in the heart-rate, but latterly under doses of 2 dr. daily the heart-rate was kept down to about 78 per minute, with little if any toxic effect—slight headache only being recorded on one occasion. Under spartein sulphate (given up to doses of 4 gr. three times a day) the pulse-rate remained between 70 and 80, though it had never been above 84 for a considerable time (ten days or so), while under no active treatment and when digitalis tincture was substituted in doses of 45 minims a day the heart-rate fell from 80 to 60 in seven days. The following tracings show the frequency of the heart-rate at intervals of two, three, and eight weeks after a course of digitalis and diuretin had been stopped —these remedies having been given in combination in doses of 12 minims of the tincture and 10 gr. of diuretin three times a day for four weeks, from September 10 to October 6, 1914.

The patient's general condition, until towards the end of 1916, seemed certainly in many ways improved, as manifested for example by a heart-rate of about 70 and a pulse fairly regular in rhythm, even when apparently not under the influence of any drug of the digitalis series. However it was also clear that with each attack of acute heart-failure she re-acted less promptly to treatment. On December 12, 1916, her local doctor told me that she was in a critical state, particularly that her respiratory distress was great, that she was very cyanotic, and that moist sounds were audible over both lungs. I met him a day or two later in consultation, found the patient substantially worse than I had ever seen her, with hæmoptysis, hæmorrhages under the skin, and evidence of profound congestion of all the viscera. She was verging on coma, and unable to take any nourishment. She died a few days later.

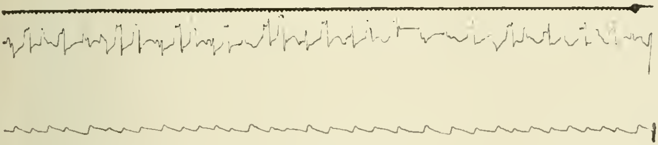


FIG. 34.

Tracings of radial and jugular pulses taken (October 20) two weeks after discontinuance of course of digitalis and diuretin (consisting of 36 minims of the tincture and 30 gr. diuretin daily for one month), showing heart-rate of 70 per minute.

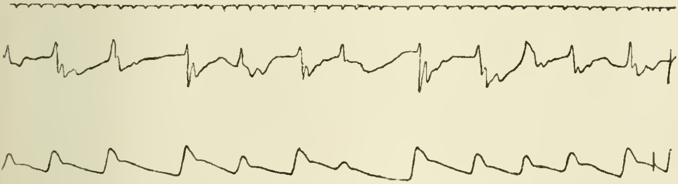


FIG. 35.

Tracings three weeks after (October 27) discontinuance of course, showing heart-rate of 70 per minute.

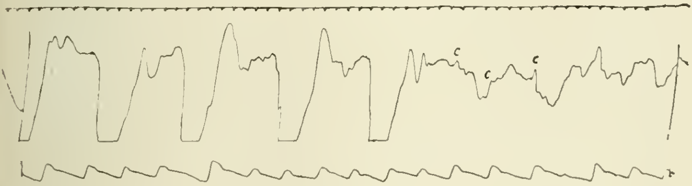


FIG. 36.

Tracings eight weeks after discontinuance (December 1), showing heart-rate of 90. On December 8 and 9 the rate was 60 and 64 respectively.

CONCLUSIONS.

In regard to the clinical features of the case the foregoing is believed to be the first complete published record in the person of one individual of the now well recognized differences before and after fibrillation of the auricle in a case usually classified as mitral stenosis. It includes observations made, during the course of seven years and up to the time of death of the patient, by several independent observers accustomed to the study of heart disease, of a patient residing in hospital for considerable periods of time during both stages of the disease. My thanks are particularly due to Sir James Mackenzie and Professor A. R. Cushny for encouragement and control in the work, and for valuable criticisms and suggestions, also to Dr. J. W. Linnell who, as Senior Resident Medical Officer at the Old Mount Vernon Hospital, contributed many careful notes, including those on the intravenous injections, and made many useful observations of fact.

The Effect of the Digitalis Group.

As illustrated by this particular case, tincture of digitalis and strophanthin conspicuously slow the heart during fibrillation of the auricle, and reduce its rate to a level substantially lower than the lowest reached, under its influence, in the presence of mitral stenosis before fibrillation of the auricle sets in. In this case it fell to 40 or a little over as compared with 60 or a little over in the pre-fibrillating stage, although by the ordinary *per os* method of 1 dr. a day it only fell to 55, as compared with 60. That the mechanism of this slowing in the post-fibrillation stage could be but little, if at all, due to increased vagal inhibition was shown in this case (as recorded in *Heart*,[1] by Cushny, Marris and Silberberg), inasmuch as the maximum degree of slowing obtained by strophanthin alone—or very near it—was observed when strophanthin and atropin were given simultaneously.

Having regard to the pre-fibrillation stage during the period in which the patient was manifestly suffering from heart weakness, although the slowing of the heart was mathematically considered merely trivial, yet substantial improvement in her condition was obvious. How much of this benefit was due to the digitalis and how much to rest and other factors is difficult to gauge, but it will be noticed that in this (as in other similar cases) an access of improvement appeared to coincide with the administration of the drug, and that in this, as in other cases, drug treatment was not commenced until a constant was believed to have been reached, including the effect of the rest-factor and, owing to the use of the *placebo*, the suggestion-factor as well. In this connexion reference may be made to a case recorded by Sir James Mackenzie in his paper on "Digitalis,"[1] in which, with complete heart block and a permanent pulse-rate of about 30, the exhibition of digitalin, though leaving the heart-rate unaffected, yet led to diuresis and the disappearance of dropsy, and eventuated in "most marked" improvement in general condition.

---

[1] *Heart*, 1912, iv, p. 51.

Methods of Administration.

In conditions of utmost urgency, where a rapid and energetic effect is imperatively needed, intravenous injection would appear to be the method of choice. At the same time it has seemed that there was a possible risk in some cases of accelerating an approaching end, and in others, where no benefit might have accrued although life were prolonged beyond the short time ordinarily required to produce its therapeutic effect, the mere fact of having employed an intravenous injection, or indeed an injection of any kind, might lead to unhappy comments by the uninitiated. In any case several instances of deaths occurring almost immediately after an injection of strophanthin have been of late years observed, probably however in most, as in one case under my own care, the injection had been given when the patient was *in extremis*. It would seem that the cases in which the urgency was so desperate as to call for this method were comparatively very infrequent, and what could be accomplished in a few minutes by the intravenous method could be accomplished by the *per os* method in a few hours, as the charts show.

The therapeutical effect that can be obtained by intravenous injection in thirty minutes can be secured with safe massive doses by the mouth in, may be, twelve hours, and in ordinary medical practice, where any injection might be expected to excite apprehension, the *per os* method is obviously preferable. The physiological or so-called toxic symptoms are however more considerable, although there is no evidence that even in conditions of extreme gravity they are an added danger. The full retarding effect in the case of strophanthus where they were more severe was obtained three or four hours before the toxic symptom of nausea and vomiting began, when the patient was obviously out of danger.

---

[1] *Heart*, 1911, ii, p. 383.

The method of graduated doses, yet substantial in amount, carried out at the old Mount Vernon Hospital and elsewhere (as enunciated by Sir James Mackenzie, Professor Cushny and others) appears, however, to be the best method for the great majority of cases of auricular fibrillation. By that method, although the effect produced is not so profound, it lasts longer and is sufficiently energetic, and it can be produced as a rule in five or six days, the drug being given in quantities of 1 dr. a day, when at the end of that time physiological symptoms usually supervene. It is surely an advantage of this method that the toxic effects being more gradually produced their first and least disturbing appearance may be used as an indication for moderating the dose or, perhaps even better, for intermitting the medicine for a few days. These are the principles of treatment arrived at by Sir James Mackenzie, but most, if not all, of those who worked in the heart wards of the hospital referred to were amply satisfied of their soundness.

The so-called "optimum dose"—i.e., the minimal dose sufficient to keep the heart-rate below, say, 75 per minute, is no doubt the dosage of choice for permanent use without continuous medical supervision, and thus the drug becomes usefully an article of diet, in effect, with, however, periods of intermission.

Comparative Value of Different Drugs.

In endeavouring to estimate the comparative value of the different drugs employed the principal data which were utilized were (1) the reduction in the heart-rate, including the absolute decrement of the beats, the maximum drop, and the lowest rate reached; (2) the time taken to produce the maximum effect on the rate; (3) the duration of the average maximum effect and the duration of what one may call the residual effect on the rate; and (4) the effect on urine excretion. Other signs were, however, utilized to afford a standard of full drug-influence on the one hand and of complete, or approximately complete, drug-release on the other. Among these were (1) the amplitude of the jugular pulse and the amplitude of the radial pulse, varying as a rule conversely—with the heart power waning, the jugular becoming larger and the radial smaller; with it waxing the reverse being the case; (2) the regularity of the radial pulse or apex beat—completely irregular in the failing condition, comparatively regular with coupling of the beats in the rising condition; (3) the force and amplitude of the apex beat and epigastric pulsation—again varying conversely and in a similar sense; (4) the size of the liver;

(5) the coming and going of a mitral systolic murmur (the diastolic remaining in any case) synchronizing with the variation in the size of the jugular and due probably to the same cause—variations in tonicity of the heart ; (6) the occurrence of cough with signs of congestion of the lungs, and (7) the colour of the face.

The Tincture of Digitalis.

The tincture of digitalis may in this case be taken as a standard, inasmuch as that was the remedy employed in the pre-fibrillation stage when, as will be remembered, it had only a trivial effect on the rate, if any, although its use apparently led to an improvement in the general condition of the patient. After fibrillation had begun it was given during two periods of about five days each, and on each occasion until a physiological or toxic effect was produced. During the first period 5 dr. were given in all, and thereby the heart-rate was reduced from about 105 to 65 in that time—i.e., an absolute decrement of 40 beats per minute. On stopping the drug, after a reactionary rise, the maximum slowing effect (about 68 per minute) was maintained for another five days, and then a rise began, a rate of 95 being reached four days later. Thus the total duration of the main effect on the heart-rate lasted nine days after the maximum drop. It is to be presumed that there was still sufficient digitalis in the system to account for an ultimate residue of about 10 beats per second.

During the second period only 3¾ dr. were tolerated before physiological effects were produced, perhaps on account of that hypothetical residue to which reference has just been made. The first dose was given with the heart-rate about 94, and this level had been previously maintained for three days. By the end of the fourth day (3¾ dr. having been taken) the heart-rate fell to 60 or 58, an absolute drop of 34 or 36 beats. It remained at this level for five or six days, then beginning to rise it reached its original level of about 105 fourteen days after the drug was stopped at the time the maximum drop had occurred synchronously with the development of toxic symptoms. It may therefore be stated that in using tincture of digitalis by the *per os* 1-dr.-a-day method, a drop of about 40 beats was obtained in four or five days, the approximately maximum effect was maintained for about five days, and the residual effect (or a greater part of it) for about seven days. [For precise data *vide* Chart 4.]

To compare with the above the effect of a massive single dose of 1 dr. of the same drug and preparation may next be described. An initial heart-rate of about 120 fell to about 75 in five hours; after a small reactionary rise the heart-rate maintained that level for twenty-four hours at least, and nearly that level for about a week, on the tenth and twelfth days it had reached 90, some residual effect being obviously still persisting. It would, therefore, seem that the equivalent of about a drachm of the tincture in the blood at approximately the same time was responsible for a drop of something over 40 beats per minute in five hours, whereas practically the same drop needed about five days to produce by a drachm a day in 15 minim doses. The patient declared she felt better about five hours after the dose was given, and there was nausea for four hours and actual vomiting for perhaps half an hour. The toxic effects were certainly more severe than those produced by the divided doses, but they were less long drawn out and they did not apparently affect her general state. The urine excretion was increased from an average of 20 oz. to a maximum of 40 oz.

The optimum dose of the tincture in the case of this patient appeared to be about 7 minims given three times a day, almost continuously; this maintained the heart-rate at about 65 beats per minute without any obvious toxic symptoms.

The Tincture of Strophanthus.

The tincture of strophanthus was given during three periods and in the same quantity, 1 dr. a day in doses of 15 minims every six hours. During the first period (which almost immediately followed the exhibition of apocynamarin) only 1¼ dr. was given before the onset of toxic symptoms—during a space of about twenty-four hours. During that time the heart-rate fell from 130 to 60, a reduction of 70 beats. Apart from what was apparently a reactionary rise, it remained about 80 for five days and then rose to the original point about five days later—i.e., ten days after the beginning.

During the second period (immediately succeeding the return to the original level of 130) 2½ dr. were given in all, in similar doses, and then toxic symptoms showed themselves. At the end of three days when the drug was discontinued the rate had fallen to about 50—a reduction of 80 beats. Apart from a reactionary rise it remained for three days about 75, and about 100 for seven succeeding days and on the next day approached the original level, being 120 per minute.

During the third period which was immediately commenced (the 1885 tincture being this time used) 1¾ dr. in all were given over a space of thirty hours, and on the following day the rate was about 60, a gross reduction of 60 beats. The rate then began to rise almost immediately; it remained about 90 for six days, two days later reaching the original level of 120, and two days later still it reached 140, 10 beats higher than at the beginning of the first strophanthus period.

The effect of the tincture of strophanthus in this case was thus more rapid, more profound and more evanescent than the effect of similar doses of the tincture of digitalis.

One observation was made with double the daily quantity, 2 dr. in one twenty-four hours in divided doses of 20 minims each. With a heart-rate of 140 to start with, it fell to 50 by the end of the twenty-four hours—an absolute fall of 90 beats. The rate then began to rise and remained about 85 for five days, after which it rose higher.

Employing single massive doses, as in the case of digitalis, first a dose of 30 minims was given and starting with a rate of 110 the rate fell to 60 in nineteen hours or less, a fall of 50 beats, or of 70 beats from the assumed original level. At the end of the next twenty-four hours it had risen to about 90 and remained about 100 for five days. There was a rapid and substantial rise in urine excretion (though no obvious œdema existed) and the toxic effects were slight.

Administering a still larger massive dose of 60 minims at one time, the heart-rate, starting at 95, fell to 45 in fourteen hours, a fall of 45 beats or of about 85 from what may be taken as the original level. A reactionary rise (to 90) followed on the next day and a sustained rise, about 80, lasted about five days and after six days more the rate had risen to 125.

The toxic effects were rather severe, vomiting lasting ten hours (as compared with thirty minutes in the case of digitalis), and nausea persisted for nineteen hours (as compared with four hours), but it should be noted that inasmuch as the original level of heart-rate in the corresponding case of digitalis was 120, in the case of strophanthus it was only 95, suggesting that some of the drug from the previous dose was still in action. The urine excretion was conspicuously augmented: starting from an average of 20 oz. *per diem* it rose to 47 oz., as compared with 40 oz., the maximum with digitalis. Comparing the heart-rates in the two cases again, the lowest point reached with strophanthus was 42, with digitalis only 74, a fall of 48 in the case of digitalis and of 53 with strophanthus, or of 75, making the starting point the same.

Strophanthin by Intravenous Injection.

The effect of the intravenous injection of strophanthin was observed on two occasions in this case. Starting on the first occasion with a heart-rate of about 150 it fell, after a dose of $\frac{1}{100}$ gr., to 80 in the course of thirty minutes, to 75 in about an hour, and to 72 at the end of five hours. It then remained between 80 and 95 for six days, on the seventh day reached 115, and on the tenth day it was 145.

On the second occasion, starting with a heart-rate of 145 after a dose of $\frac{1}{250}$ gr., it fell to 76 in about six hours, and four days after the injection it was 95, while two days later it was so rapid as to be uncountable. The effect of the smaller dose was thus nearly as profound, but its duration was distinctly shorter. In neither case were toxic effects severe, although after an intravenous injection of "digalen" on one occasion they were very severe, vomiting being excessive and prolonged.

The lowest rate reached was however only 72, as compared with 50, twenty-four hours after 2 dr. of the tincture by the mouth, or with 45 in fourteen hours after a single dose of 1 dr. of the tincture.

Apocynamarin.

The exhibition of apocynamarin—the active principle of *Apocynum cannabinum*, the American hemp—administered by the mouth, was followed by a slight apparent reduction in the heart-rate, but it was so slight as to seem of little, if any, therapeutic value. Its administration, moreover, resulted in so much gastric irritability, or vomiting induced through other channels, as, in our judgment, to negative its employment by this route at any rate. The vomiting was, however, so severe as to make it appear possible that only little of the dose given was absorbed. On the other hand the recommended dose is 3 mg., to be given two to five times a day, and the maximum dose administered in this case was only 5 mg. twice a day, two-thirds of the maximum daily quantity recommended, and the minimum only 1 mg. twice a day. There was no helpful effect on urine excretion observed, for whereas on the three days preceding its administration the excretion was respectively 21 oz., 27 oz., and 20 oz. (no active medicine of any kind having been given since digitalis was stopped twelve days previously), on the three succeeding days it was only 18 oz., 14 oz., and 12 oz., and during the three following days, when 1 mg. was given twice a day for two of the days, it was only 14 oz., 13 oz., and 18 oz. Although the excessive vomiting during the earlier period of administration might be considered to account, in part at least, for the scantiness of the urine excretion, there was no vomiting during the later period.

On a later occasion (May 29 to 31, *vide* p. 24 and Chart 6) this drug was exhibited again at a time when the rate of the heart had risen to 134 per minute during its release from the effect of apocynum tincture (under the influence of which it had fallen from 140 to 66 per minute) when it was administered in divided doses equivalent to 4 mg. a day for two days. In spite of it the heart-rate rose from 134 to 140 per minute and remained at that level for the greater part of that period (forty-six hours) until it was brought down to 50 in eighteen hours by 20 minim six-hourly doses of strophanthus tincture.

It might therefore be concluded that so far as this particular case was concerned it remains doubtful whether it had any retarding influence on the heart-rate, and that possibly because of its conspicuous untoward effects. Whether it would have proved more efficacious if given intravenously, or if given in very small spaced doses over an extended period, was not investigated. There was no appreciable increase of the urinary excretion, neither were the subjective sensations of the patient alleviated.

The Tincture of Apocynum.

The tincture of apocynum was given in increasing doses continuously for a period of 12 days, for four days in quantities of 100 minims a day, then for five days in quantities of 2½ dr. a day, and, lastly, for three days in quantities of 4 dr. a day. Starting with a heart-rate of 142, at the end of two days (during which about 3½ dr. were taken) the rate fell to 72, a drop of 70 beats, and although it appeared disposed to rise again (as to 95 on the fifth day) the increase of the quantity by one half only brought it back to about the same level (70). Further increase, equivalent to two and a half times the original dose (4 dr.), only brought it to 65, the lowest point reached. It remained about this level, moreover, during the whole period of these larger doses, (three days) terminated by the occurrence of rather severe toxic symptoms. These continued for two days after the drug was stopped. On the third day after its discontinuance the rate had risen to 85, on the seventh to 105, and on the ninth to 140, the original level.

There was thus a quite definite slowing effect on the heart-rate, but as compared with that of digitalis it was tardier, less energetic, and more evanescent. With the largest doses there was a clear augmentary effect on the urine excretion, rising from an average of about 18 oz. to 30 oz. in the twenty-four hours, but even with these largest doses the increase was not so great (40 oz.) as with digitalis. It may be noted that with this drug also the systolic mitral murmur disappeared as the heart-rate fell to its lowest, signifying, as was believed, an effect on myocardial tonicity.

The Tincture of Squill.

Although no very extensive observations were made on the efficacy of this remedy, in this case it appeared to be equivalent to a weak digitalis. Under the administration of quantities of 1½ dr. a day for five days the heart's action kept fairly regular, with, however, comparatively slight reduction in the rate, but orthopnœa and some œdema of the feet persisted, and there was much cough. Increased to 2 dr. a day and continued for about five weeks in these quantities the œdema and cough disappeared, and the heart-rate remained throughout about 72; there was an increase of the urine excretion from an average of a little under 20 oz. a day to about 25 oz. a day. Toxic symptoms under the drug in these quantities were notably slight, there being no record of any other than a little headache.

Spartein Sulphate.

As to the sulphate of spartein the record of activity was negative. Although given in quantities of 12 gr. a day there was no appreciable effect on the heart-rate. For ten days before it was begun, during which no active treatment of any kind was given, the rate was about 80 (this was at a time when her general condition had manifestly much improved), and it remained at that level during the term of administration. When the tincture of digitalis was substituted (in moderate doses of 45 minims a day) the rate fell to 60 in seven days.

Comparative Toxicity of the Different Drugs.

The toxicity seemed, in the case of this patient at any rate, to vary with the potency of the drug, or, expressed in other words, with the individual sensitiveness of the patient to the respective drugs. It would seem that in the case of any particular patient the occurrence of untoward symptoms might well govern the selection of any particular drug. On the whole it seemed that apocynum was the most toxic, strophanthus coming next, digitalis after that, and possibly squill least of all. This excess of toxicity of strophanthus over digitalis may have been the main explanation of this patient's persistent personal preference for digitalis. On the other hand, in the writer's experience, just as fixed a personal preference for strophanthus as against digitalis has been maintained, and possibly from a like motive. The minimal toxity of squill in this case may have been because, in the doses given, its entire physiological effect was feebler.

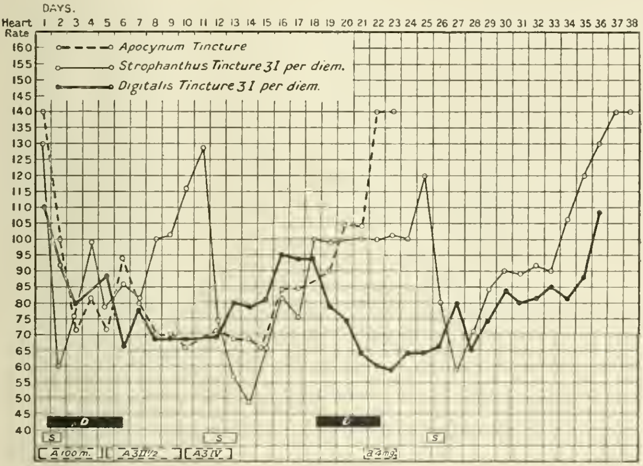


CHART 14.

Composite curves showing (in daily periods) the effect on the pulse-rate of tincture of digitalis, in 1 dr. a day doses; of tincture of strophanthus in 1 dr. a day doses; and of tincture of apocynum, in quantities of 100 minims to 4 dr. a day; also the negative effect of 4 mg. apocynamarin.

Comparative Potency of the Different Drugs.

Generalizations under the above heading, from the present case at any rate, can only be approximate, for it must be surmised that the activity of one drug over another probably varies among individuals within fairly wide limits. The potency of the drugs used may be ranged in respect of this particular patient in the following order: strophanthus, digitalis, squill, apocynum, and least, if any, spartein.

The accompanying composite curves (Chart 14) show the effect of (1) tincture of digitalis, (2) tincture of strophanthus in quantities of 1 dr. *per diem* in each case, and (3) of tincture of apocynum in quantities of 100 minims to 4 dr. *per diem.* Also the negative effect of 4 mg. of apocynamarin: the time being for all represented in days.

Chart 15: The *immediate effect* (in hours) of massive doses of the drugs: (1) Tincture of digitalis, 1 dr.; (2) tincture of strophanthus, $\frac{1}{2}$ dr.; (3) tincture of strophanthus, 1 dr.; and (4) strophanthin intravenously, $\frac{1}{100}$ gr.

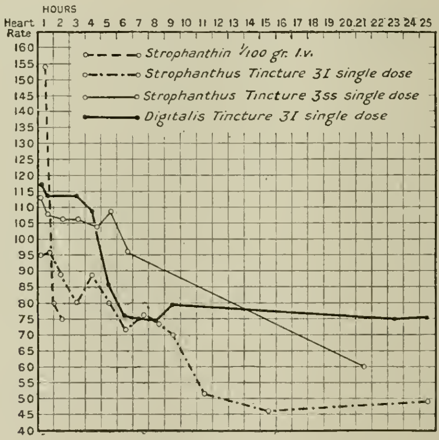


CHART 15.

Composite curves showing (in hourly periods) the immediate effect of massive doses of tincture of digitalis 1 dr., tincture of strophanthus $\frac{1}{2}$ dr., and tincture of strophanthus 1 dr.; also of strophanthin $\frac{1}{100}$ gr., intravenously.

Chart 16: The *duration of effect* (in days) of massive doses of (1) tincture of digitalis, 1 dr.; (2) strophanthin, $\frac{1}{100}$ gr.; (3) tincture of strophanthus, 1 dr.; (4) tincture of strophanthus, $\frac{1}{2}$ dr.; and (5) tincture of strophanthus, $2\frac{1}{3}$ dr. in twenty-eight hours (seven 20-minim doses).

The curves support the conclusion that in regard to rapidity of effect strophanthin was in this case the most effective; for duration of effect, and having regard to toxicity, in this case digitalis seemed to be the remedy of choice.

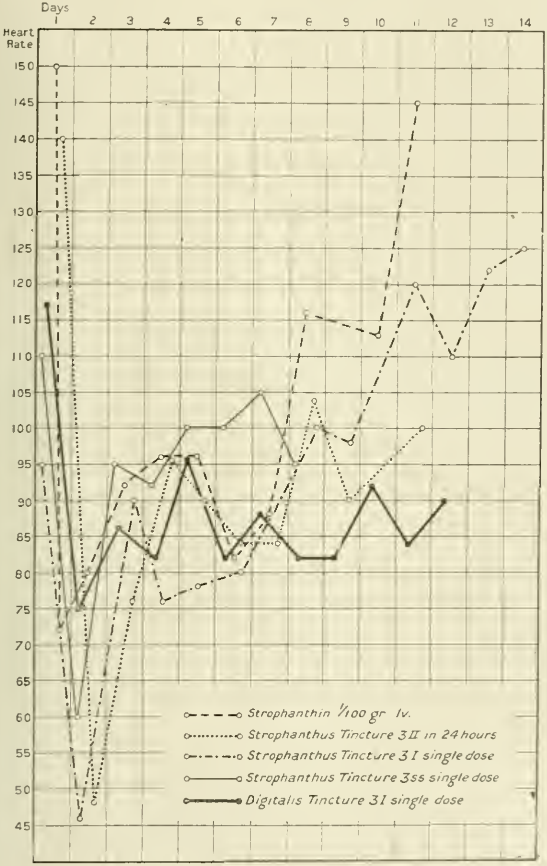


Chart 16.

Composite curves showing (in daily periods) the duration of the effect on the pulse-rate of massive doses of tincture of digitalis 1 dr., tincture of strophanthus ½ dr., tincture of strophanthus 1 dr., tincture of strophanthus 2 dr., in twenty-four hours; and of strophanthin $\frac{1}{100}$ gr. intravenously.

The following tabular summary of results as to the activity of the different drugs is added as supplementing the curves in the charts.

TABLE SUMMARIZING THE RESULTS AS TO THE ACTIVITY OF THE DIFFERENT DRUGS EMPLOYED.

Drug administered	HEART-RATE		Quantity of drug	Time taken to produce maximum effect	Decrement in beats per minute
	Before	After			
Before fibrillation :—					
Digitalis tincture ...	70	64	1 dr. a day	5 days (about)	6
After fibrillation :—					
Digitalis tincture ...	100	60	1 dr. a day	4 days	40
,, ,,	125	75	1 dr. in single dose	5 hours	50
Strophanthin	150	80	$\frac{1}{100}$ gr. (intravenously)	30 minutes	70
Strophanthus tincture	130	60	1 dr. a day	24 hours	70
,, ,,	128	56	,,	2 days	72
,, ,,	120	58	,,	2 days	62
,, ,,	140	48	2 dr. in 24 hours	18 hours	92
,, ,,	102	68	½ dr. in single dose	20 hours	34
,, ,,	100	50	1 dr. in single dose	10 hours	50
Apocynum tincture ...	142	72	100 minims a day	4 days	70
,, ,,	—	70	150 minims a day	5 days	72
,, ,,	—	65	240 minims a day	3 days	77

Proceedings of the Royal Society of Medicine.

SUPPLEMENT

(Vol. XI, No. 1, November, 1917).

NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.*—Ed.]

The New System of Gynæcology. Edited by Thomas Watts Eden, M.D., F.R.C.S.E., F.R.C.P., Temporary Major R.A.M.C., and Cuthbert Lockyer, M.D., B.S., F.R.C.S., F.R.C.P. In Three Volumes. With numerous illustrations in colour and in black and white; pp. xv + 761, vii + 875, viii + 871. Price £6 6s. net. London: Macmillan and Co., Ltd., 1917.

These three volumes form undoubtedly the largest and most comprehensive gynæcological treatise which has appeared in any language. In order to present the modern aspects of gynæcology, and to indicate the changes which this subject has gone through in recent years, the articles, with but few exceptions, are complete and practically exhaustive. As the gynæcologist has to be prepared to deal with any condition which may be met with on opening the abdomen, several articles on general surgery have been included. It must be admitted that the gynæcologist of to-day must be a surgeon rather than a physician, and the diseases which complicate gynæcological affections must be dealt with when discovered, sometimes quite accidentally, if the best interests of the patient are to be considered. For these reasons articles on the vermiform appendix, intestinal suture. rectum, kidney, bladder, and breast have been included in the work. Undoubtedly these articles increase the value of the work to the gynæcologist.

The first volume includes anatomy, methods of examination, ectopic gestation, septic and other infections of the generative tract. Professor Elliot Smith and Dr. Stopford contribute the article on Anatomy, whilst that on Physiology is by Dr. Louise McIlroy. Dr. Ernest Shaw writes on the Types of Micro-organisms met with in the Generative Tract, Dr. Beckwith Whitehouse on Methods of Examination, and Dr. Topley on the Examination of the Blood. Dr. Ballantyne contributes Malformations, and Dr. Blair Bell Disorders of Function. The article on Ectopic Gestation is written by Dr. G. F. Blacker; Septic Infections by Dr. Carlton Oldfield; and of the other infections, Gonorrhœa has been done by Mr. T. G. Stevens; Tubercle by Mr. Clifford White; Salpingitis by Professor Munro Kerr; Cellulitis by Dr. Fairbairn; Syphilis by Mr. Arthur Shillitoe; Streptothrix Infections and Hydatid Disease by Dr. Taylor Young and Professor D. A. Welsh (Sydney). The volume closes with an article on Nervous Diseases associated with morbid conditions of the pelvic organs by Dr. Purves Stewart.

The second volume includes the local diseases of the generative tract. Mr. Comyns Berkeley contributes the articles on Diseases of the Vulva and Vagina; other contributions are from Professor B. T. Watson (Toronto) on Cervical Erosion and Chronic Endometritis; Dr. Fletcher Shaw on Chronic Metritis and Allied Conditions; Professor McKerron on Morbid Involution; Dr. Hastings Tweedy on Laceration of the Cervix; Dr. Cuthbert Lockyer on Myomata and Adenomyomata; Dr. R. W. Johnstone on Sarcoma of the Uterus; Professor T. Wilson on Cancer of the Uterus; Professor J. H. Teacher on Chorionepithelioma; Professor W. W. Chipman (Montreal) on Backward Displacements; Dr. Fothergill on Prolapse; Professor Walter Swayne on Chronic Inversion of the Uterus; Dr. Cuthbert Lockyer on Cysts and Tumours of the Fallopian Tubes; and Dr. Herbert Williamson and Dr. J. D. Barris on Tumours of the Ovary.

The third volume includes Diseases of the Breast by Mr. C. C. Choyce; the Vermiform Appendix by Mr. H. J. Paterson; Methods of Examination of the Urethra and Bladder by Mr. J. W. Thomson Walker; Infections of the Urinary Tract by Mr. W. Gilliatt; Hernia in Women by Dr. Eardley Holland; Diseases of the Rectum by Mr. Lockhart Mummery. The remaining sections comprise (*a*) Gynæcological Operations: Technique by Dr. Watts Eden; Anæsthetics by Dr. Felix Rood; Ovariotomy by Professor Archibald Donald; Hysterectomy by Dr. Arthur Giles; Surgical Operations on the Gravid Uterus by Professor Munro Kerr; Intestinal Complications in Gynæcological Surgery by the late E. W. Scott Carmichael; Vaginal Cœliotomy by Professor H. C. Taylor (New York City); Fistulæ in the Female Genital Tract by Professor J. B. Hellier; Minor Uterine Operations by Mr. Victor Bonney; (*b*) the After-treatment of Gynæcological Operations by Professor F. H. Martin (Chicago); (*c*) General Gynæcological Therapeutics by Dr. Amand Routh; (*d*) Radio-therapeutics by Mr. Lionel Provis and Dr. Robert Knox. Great care has been expended on the illustrations, of which many are in colour, and the general "get-up" of the book leaves nothing to be desired.

MALINGERING, OR THE SIMULATION OF DISEASE. By A. BASSETT JONES, M.B.Lond., and LLEWELLYN J. LLEWELLYN, M.B.Lond. With 5 plates; pp. xxvi + 708. Price 25s. net. William Heinemann, 1917.

The aim of the authors is to systematize our knowledge of malingering, and to perfect our powers of discriminating between feigned and genuine disease. The book opens with a study of the subject in its historical aspect, and the authors then proceed to discuss the ætiology of malingering—its origin in the primitive passions, and the variety of the motives that suggest its practice. The influence of National Insurance and compensation on its incidence is afterwards analysed, the writers concluding that these enactments are merely contributory agencies in the growth of this form of social corruption. As to its psychology, they attribute it to a depravation of the primitive imitative impulse—a view suggested on biological grounds and supported by the type of individual most prone to malinger—the hysterical, weak-minded, or neuropathic. The definition and classification of the various forms of malingering are next discussed, and a separate chapter is devoted to the "Formation of a Decision"—the danger of reckless diagnosis, &c. Section II deals with malingering in relation to the nervous system. It opens with a chapter on the differentiation of hysteria from simulation. Subsequently the sensory disorders—pain, hyperæsthesia, anæsthesia, analgesia—are discussed, and the methods of diagnosing feigned from genuine sensory disturbances indicated. Special chapters are devoted to pain in the back and pain in the lower extremities. The motor system is dealt with seriatim in successive chapters allotted to the discrimination of genuine from simulated giddiness, Rombergism, tremor, contracture, paresis, paralysis, &c. Feigned epilepsy and insanity are dealt with in detail. The section closes with one on the false imputation of nervous disorders to injury with a special view to the requirements of medical witnesses in compensation cases. The special sense organs have received special consideration particularly the eye. The third section deals with malingering in relation to internal diseases —cardiac, respiratory, gastro-intestinal, and uro-genital diseases—most of which have been simulated. The question of malingering in relation to external diseases occupies the fourth section. Here physical strain in relation to accident is discussed, also the responsibility of the alleged trauma, the influence of pre-existing disease, and other medico-legal questions. In sequence thereto, the authors deal with the relationship of malingering to cutaneous disorders, infections, herniæ, tumours, muscular and osseous affections, also joint diseases. The section terminates with a *résumé* of the principles on which we may best estimate the depreciation in working capacity that has followed injury or accident—mutilations, fractures, or joint disabilities. The fifth section is concerned with the prophylactic disciplinary and educational measures that appear to the authors likely to secure the restriction of malingering. It is hoped that the work may prove helpful to naval and military surgeons, those interested in pensions, assurance, and compensation, and also to members of the legal profession and to political and social reformers.

LESSONS IN PHARMACEUTICAL LATIN AND PRESCRIPTION WRITING AND INTERPRETATION. By HUGH C. MULDOON, Ph.G. Pp. vii + 173. Price 6s. net. New York and London: Chapman and Hall, Ltd., 1916.

This work, which is the product of several years' experience in the teaching of Pharmaceutical Latin, emanates from the instructor in organic and analytical chemistry and Latin at the Massachusetts College of Pharmacy, Boston. The volume is divided into twenty-five lessons, in which the exercises and sentences are carefully graded in difficulty, and lead gradually to prescription work. The appendix contains a list of abbreviations, tables of declensions of nouns and adjectives, tables of conjugations, and Latin-English and English-Latin vocabularies. Though primarily designed as a text-book for colleges of pharmacy, the writer hopes that it will prove of value to the student of medicine, and also serve as a reference book for the practising pharmacist and physician.

HANDBOOK OF PHYSIOLOGY. By W. D. HALLIBURTON, M.D., LL.D., F.R.C.P., F.R.S. Thirteenth edition. With 581 illustrations in the text, and 3 coloured plates; pp. xx + 930. Price 16s. net. London: John Murray, 1917.

Halliburton's "Handbook of Physiology" is so well known as to need no description. One need only draw attention to this, the thirteenth edition, which has been thoroughly revised, and has had some new illustrations added. There is an interesting note by the publisher, which describes the history of the volume since its original production by William Senhouse Kirkes, of St. Bartholomew's Hospital, in the year 1848.

DANGERS IN NECK-WEAR. By WALTER G. WALFORD, M.D. With 14 illustrations; pp. xi + 171. Price 4s. 6d. net. London: H. K. Lewis and Co., Ltd., 1917.

The author in this book has been at great pains to inculcate his doctrine of the dangers of tight neck-wear. He himself is the living witness of the truth he acclaims. Some years ago life became to him a misery, frequent attacks of vertigo being one of his most pressing symptoms. A well-known specialist informed him that he was suffering from a thrombus in a small cerebellar artery, and congestion of the brain. After some months without any improvement he made the lucky discovery that he always felt better when nude. He therefore gave up all dieting and treatment, and changed his dress in neck-wear to an inch wider than formerly. The result was "instant comfort and relief." A marvellous improvement in his health ensued, but the story of himself must be read in order to gather its due significance, as well as that of the many instances he narrates where similar relief was obtained by similar treatment. Even gout and rheumatism, skin diseases, epilepsy—to mention only some diseases—are among those which have been benefited by the author's method. The book introduces a novelty in treatment, in support of the efficacy of which much evidence is furnished.

STUDIES IN MALARIA. By HUGH STOTT, M.B., B.S.Lond., Captain I.M.S. With 18 plates and 50 charts; pp. xvi + 190. Price Rs. 7.8. Calcutta and Simla: Thacker, Spink and Co., 1916.

The studies in malaria are of the disease as it occurred in Mandalay. The book is divided into five parts, and the first, Part I, is an inquiry into the variation in the malaria admission rate in the five population groups living within the walls of Fort Dufferin, Mandalay. The variation is great—from 1 to 62 per cent. He publishes charts showing that there is not a continuously high sick rate, but rather recurring epidemic periods, and that whilst in epidemic periods the British troops are the chief sufferers, though the curves for Indian troops are similar but lower in non-epidemic times, the Indian troops maintain a persistent degree of infection. He discusses in detail the ætiology of the various epidemics and has recorded the anopheline breeding places and shows that the species vary with the season. He considers that variations in the different groups were affected mainly by the anti-malarial measures adopted, and of these the prophylactic use of quinine in the usual Indian method did not much affect the incidence of the disease; and gives figures. The regular and careful use of mosquito nets and measures being adopted to diminish the number of anopheline breeding places had distinct beneficial results. Part II is an inquiry into the effects of use of quinine as a prophylactic in the Indian method, with controls of a nearly equal number of (rather under 4,000) persons under the same conditions but not taking quinine, and amongst the quinine takers in each group were 65·8 admissions for malaria per 1,000, whilst amongst the non-quinine takers there were 67·8. No details are given as to the stage of digestion when the quinine was taken. Anti-mosquito measures, such as careful use of mosquito nets and destruction of breeding places, are recorded. Chapter IX gives a full account of the value of blood examination. Chapters X and XI indicate the success of quinine administration in treatment of malaria, and that treatment by the injection of the drug is superior to oral treatment. In Chapter XIII the author gives illustrative cases of types of malaria. There are abundant charts, tables and photographs illustrating various points in the articles.

PHYSICAL CHEMISTRY OF VITAL PHENOMENA: FOR STUDENTS AND INVESTIGATORS IN THE BIOLOGICAL AND MEDICAL SCIENCES. By J. F. MCCLENDON, Assistant Professor of Physiology in the University of Minnesota. Pp. viii + 240. Price $2 net. Princeton, U.S.A.: Princeton University Press, 1917.

Some knowledge of the main principles of physical chemistry is almost essential nowadays for the student of any biological science; and the purpose of this book is to bring together the more recent observations in physical chemistry and to indicate in outline the part which physical processes play in vital phenomena. The author deals successively with electrolytic dissociation and osmotic pressure, with H ion concentration and the means whereby it may be measured, and with surface tension, adsorption and colloids. The latter part of the book is devoted to a discussion of the physical explanation of absorption and secretion, of the nature of muscular contraction and of cell division and fertilization. Many of the physical methods employed in biological work are described, and there is a chemical summary at the end of the book, and also an extensive list of papers bearing on the subject.

ELECTRO-THERAPY IN GYNÆCOLOGY. By SAMUEL SLOAN, M.D., F.R.F.P.S.G. With 39 illustrations; pp. xxii + 298. Price 12s. 6d. net. London: William Heinemann, 1917.

In this publication the author has broken new ground. As stated in the preface this book is essentially a record of the writer's own work during the past twenty years in electro-therapy as applied to gynæcology. It is not intended to be taken as a text-book either in electro-physics or gynæcology. While a working knowledge of the latter is assumed, the author devotes several chapters to the general principles and laws of electricity, and to the various forms of electric energy that may be employed. As regards the clinical record no case is dealt with that is obviously surgical. As the result of a lengthy experience the author states his conviction that the medical treatment of diseases of women by the usual methods is, or may be, a helpful adjunct to electro-therapy, but, without the latter, the cure will often be materially hindered; moreover that electro-therapy can, in suitable cases, take the place of all other therapeutic measures, and with lasting benefit. Parts I, II, and III deal respectively with electro-physics, electro-medical apparatus required, and the principles of electro-therapeutics. Part IV is devoted to constitutional diseases, mostly functional, to which women are specially liable—viz., disorders of the cerebrospinal nervous system and abdominal disorders. In introducing the subject the author deprecates the exclusive attention frequently paid to pelvic conditions, tritely remarking that "too much attention may be devoted to the womb, and too little to the woman." Part V deals with pelvic affections, and contains chapters on neuroses of the pelvic structures, subinvolution and hæmorrhage, sepsis of the genital tract, pelvic inflammation, fibroid tumours, sterility, affections of the female bladder, and affections of the rectum and anus. In the appendix is a record of 212 obstinate cases of pelvic disease in women treated by the author by electric methods during the past twenty years. In a complete summary occupying nineteen pages the results, favourable or otherwise, are impartially set out. The text is supplemented, where necessary, with illustrations and diagrams. There is a full index.

TEXT-BOOK OF OPHTHALMOLOGY. By HOFRAT ERNST FUCHS. Authorized Translation from the Twelfth German Edition; completely revised and reset, with numerous additions specially supplied by the Author and otherwise much enlarged by ALEXANDER DUANE, M.D. With 462 illustrations; pp. xxv + 1067. Price 30s. net. Philadelphia and London: J. B. Lippincott Co., 1917.

This new American edition of Fuchs's text-book is not based upon a new issue of the German work. Nor, probably in consequence of the war, is any new edition of the latter under contemplation. The translator, however, in collaboration with the author, has introduced many new features in this edition, thus constituting it an advancement upon the last German issue. Some radical alterations in the arrangement of the text have been adopted: among other changes the section on the diagnosis of ocular paralyses has been entirely re-written, and further attention given to tuberculin and vaccine therapy, the visual field and colour testing, the mapping of scotomata and the blind spot, the ætiology of trachoma and iritis, sclerosis of the choroid, the newer operations, glaucoma, the different forms of retinal degeneration, &c. All the contributions, as in former editions, for which the translator is responsible, are distinguished by his initials; but in this edition these interpolations, in brackets, occur with such frequency that it is evident the text has been largely augmented thereby. The revision of the whole work has been thoroughly carried out, and the improvements are manifest.

SCIENCE AND THE NATION. Essays by Cambridge Graduates, with an Introduction by the Right Hon. Lord MOULTON, K.C.B., F.R.S. Edited by A. C. SEWARD, F.R.S. Pp. xxii + 328. Price 5s. net. Cambridge: The University Press, 1917.

A prominent factor of a war of such magnitude as that from which the world is now suffering is the extent of the educative influence it exerts. There is hardly a sphere of human activity and thought into which its influence fails to penetrate. It becomes at once active in exposing the neglected opportunities and defects of a peace time existence. A notable example of this has been the exposure of the deplorable attitude assumed by the British nation in respect to the development and claims of science. For years it has been the policy of the successive Governments of this country to ignore the value of the asset of science as an integral and indispensable element in the progress of the nation, industrially and otherwise. The blindness of that policy has now been revealed in all its reprehensible nakedness. True, it may be, that by instinct we are not a scientific race. "Shopkeepers," as Napoleon described us, are not usually endowed with scientific aims; in this sense, therefore, his somewhat opprobrious epithet is not, perhaps, inapplicable. On the other hand, there is no monopoly in science, nevertheless difficulties are associated with its pursuit, difficulties which, from the national aspect, require to be dealt with if the nation is to profit by its progress. Those difficulties are well understood, and need not be more particularly mentioned. Meanwhile, it is satisfactory to note, the signs are so far favourable that the lethargy of the nation, after a turbulent awakening, is now being supplanted by the realization of the urgency of extending to English scientists that material assistance and encouragement which their research work demands. So great is the need for this encouragement that were—the idea is not Utopian—a Ministry of Science to be formed as a Government department, the time would not be long before such a profitable enterprise would be able to prove its value. This preamble has been suggested by the work under review. The volume consists of an endeavour to impress upon the nation the value of science as a national asset. The mission it undertakes is mostly contributed to by Cambridge graduates, well known representatives of English Science, who by means of essays, illustrate, in their respective spheres, the necessity for the scientific education of the nation. Thus among the subjects dealt with are the "national importance of chemistry," the "science of botany and the art of intensive cultivation," the "modern science of metals, pure and applied," "systematized plant breeding," "medicine and experimental science," and the "specific treatment of disease." An introduction by Lord Moulton emphasizes the objects which the book so conspicuously seeks to obtain.

Clinical Surgical Diagnosis: for Students and Practitioners. By F. de Quervain. Second English Edition, translated from the Fifth Edition by J. Snowman, M.D. With 604 illustrations and 5 plates; pp. xix + 841. Price 35s. net. London: John Bale, Sons and Danielsson, Ltd., 1917.

The work by the Professor of Surgery in Basle now appears in a second English edition, with 92 additional illustrations. It is divided into 111 chapters, each of which forms a brief lecture on the chief points in the clinical diagnosis of the surgical affections met with in the region dealt with. The illustrations are chiefly photographs of patients showing surgical disease, not only common forms but also some quite rare conditions. They are all admirably reproduced. The arrangement of subjects is from the head to the heel, those subjects being omitted which are considered within the domain of the specialist. The book is thus easy to consult and is particularly suitable for the general practitioner, as it emphasizes those features which are to be noted by clinical observation, laboratory methods receiving a brief mention.

The Treatment of Infected Wounds. By A. Carrel and G. Dehelly. Translation by Herbert Child, Captain R.A.M.C. (Temp.), with introduction by Sir Anthony A. Bowlby, K.C.M.G., K.C.V.O., F.R.C.S. Illustrated; pp. x + 238. Price 5s. net. London: Baillière, Tindall and Cox, 1917.

This is an account of the Carrel method of treating gunshot wounds, which consists in keeping the surface and interior of the wound wet with a special solution in which chlorine acts as an antiseptic. By this method in the course of some ten days the discharge is rendered free from septic micro-organisms, when the wound can be closed. There is required a special apparatus, also a particular solution, an adequate nursing staff to attend to each patient every two hours, and a bacteriological staff for the examination of the discharges. The solution must be accurately made after the Dufresne process, in which chloride of lime having 25 per cent. of active chlorine is mixed with anhydrous carbonate of soda and bicarbonate of soda, so that there results a solution containing 0·475 per cent. of hypochlorite of soda. The solution must be kept in the dark and soon used, for it changes after a time into chloride and chlorate of sodium. It is used cold and undiluted. Preliminary to starting the instillation the wound is examined externally, and by radiography for fractures and foreign bodies. Next, after painting the skin around with iodine tincture, bruised skin and muscles are excised, hæmorrhage arrested, and foreign bodies removed. As far as possible the incisions for enlarging and opening up the wound are so arranged as to be placed on the upper aspect, and counter openings are not made. Rubber tubing, 1 mm.

thick and 4 mm. in diameter of the lumen, is cut into lengths of 30 to 40 cm.—some lengths are closed at one end by ligature, and a series of holes punched for a variable length from the closed end, and again some of these latter have the holed part surrounded by a sheath of bath towelling. Two or three, or several of these tubes are passed into the various recesses of the wound, and the outer ends of the tubes brought together by branched glass junctions, to be connected with the single tube leading from a glass reservoir, the flow through which is controlled by a pinch-cock. In the case of a large surface wound, a tube is laid along the surface and covered by a thick compress. Every two hours the nurse releases the pinch-cock just long enough to let out fluid sufficient to keep the wound wet without soaking the outer dressings and the bed. By the interposition of a drop tube a continuous instillation may be set up, or instead of the reservoir a syringe may be employed. When bacteriological examination shows that the wound has been free from septic germs, sutures may be inserted, or the margins of the wound approximated by strapping. A large number of illustrations render easy the understanding and adoption of the method.

THREE LECTURES ON THE TREATMENT OF DIABETES MELLITUS BY ALIMENTARY REST (THE "ALLEN" TREATMENT). By O. LEYTON, M.D., D.Sc., F.R.C.P. Pp. iv + 64. Price 3s. net. London: Adlard and Son and West Newman (Ltd.), Bartholomew Close, E.C., 1917.

In the three lectures reprinted here Dr. Leyton describes the new treatment of diabetes by starvation or "alimentary rest," based upon the experimental work of Allen. After a brief reference to Allen's observations and the principles underlying the treatment, a short description of the methods employed in investigating cases of glycosuria is given. The details of the system of treatment as elaborated by Joslin are then considered and specimen diets, adapted to the use of English patients, for finding the tolerance, are printed in tabular form. A short list of the commoner articles of diet arranged so as to allow of substitution is appended. Attention is called to the contra-indications to the treatment and to the necessary preliminaries antecedent to the patient being deprived of food, also to the signs which may indicate that the fast should be terminated before the urine has been rendered sugar-free. Illustrative cases are cited, and the lessons to be learnt from both successes and failures are considered.

FOOD POISONING. By EDWIN OAKES JORDAN, Chairman of the Department of Hygiene and Bacteriology, the University of Chicago (University of Chicago Science Series). With 11 illustrations; pp. viii + 115. Price $1.00. Chicago: University of Chicago Press, 1917.

This disorder is commoner than is usually recognized in the United States as the cases are not notifiable; but it is estimated that from 15,000 to 20,000 persons are attacked every year. So far as the available evidence goes there is no very striking seasonal incidence, though the warmer months show a slight predominance. This work, which naturally does not discuss food poisoned with criminal intent, deals with cases due to food-borne pathogenic bacteria and parasites, the toxic effects of formed mineral or organic poisons introduced accidentally or with the object of improving the appearance or keeping properties of food, and also with the occasional instances of poisoning due to organic poisons present in normal vegetables, such as mushrooms, and fish, for example, the well known Japanese fugu. As cases of food poisoning fall into two categories—the much larger and more important one in which the injurious constituent is contained in the food, and the smaller in which the individual's idiosyncrasy is responsible for disturbance produced by essentially wholesome food—a chapter is devoted to food sensitization or allergy, in which in addition to the familiar example of asthma reference is made to skin diseases, and especially to eczema, as probable results of anaphylaxis. In the concluding chapter on poisoning of obscure or unknown nature, milk sickness or trembles and the various deficiency diseases are briefly discussed. There is a full index.

LE PALUDISME MACEDONIEN; CARACTÈRES CLINIQUES ET HÉMATOLOGIQUES; PRINCIPES DE THÉRAPEUTIQUE. Par P. ARMAND-DELILLE, P. ABRAMI, G. PAISSEAU, et HENRI LEMAIRE. Préface du Pr. LAVERAN. Illustrated; pp. viii + 109. Price 4f.40. Paris: Masson et Cie, 1917.

The present volume is based on the writers' observations on malaria during the present War in the French Army of the East. The disease as it occurred in Macedonia was one of exceptional gravity, partly because the patients had never had any previous attacks, and partly because they had been exposed to all the hardships of a trying campaign. Although the incidence of the disease was high, the mortality was fortunately low, owing to the ample provision of quinine. The clinical description contains a full account first of primary paludism which begins at the time of infection and lasts till the appearance of the intermittent attacks, and then of secondary paludism, which is characterized by the occurrence of the ague fits. Diagnosis is discussed merely from the parasitological and hæmatological aspects, only such technique being described as can be carried out in the simplest laboratories. In the chapter on treatment details as to the methods of administration of quinine are given. It is noteworthy that, contrary to the opinion of Professor Laveran as expressed in the preface, the writers suspend the administration of quinine between the attacks.

BLOOD PICTURES: AN INTRODUCTION TO CLINICAL HÆMATOLOGY. By CECIL PRICE-JONES, M.D.Lond., Captain R.A.M.C.(T.C.). With 5 coloured plates and 4 illustrations in the text; pp. 91. Price 6s. 6d. net. Bristol: John Wright and Sons, Ltd., 1917.

As stated in the preface, this small book is a "guide to the interpretation of reports on blood examinations" for the use of the clinician, and is not intended to be a complete textbook on hæmatology. The book opens with a chapter on the technique of blood counts. Here the author confines himself to a description of only one method for each investigation —viz., Bürker's counting chamber and the Thoma pipette for the enumeration of the blood cells, Haldane's method for estimating the percentage of hæmoglobin, and Jenner's stain for the differential films. In subsequent chapters a detailed description of each variety of blood cell with coloured illustrations is given, and a section is devoted to a consideration of tho normal blood picture. In the second part of the book the author points out the main characteristics of the blood picture in various diseases—bacterial, protozoal, malignant, leukæmic, &c.— and concludes with appendices on Jenner and Leishman's stains, the measurement of the erythrocyte, and a phylogenetic diagram of the white cells.

A LABORATORY MANUAL OF ORGANIC CHEMISTRY FOR MEDICAL STUDENTS. By MATTHEW STEEL, Ph.D. Pp. viii + 193. Price 6s. net. New York and London: Chapman and Hall, Ltd., 1916.

The advance of biological chemistry has entailed a more comprehensive training of the medical student in experimental organic chemistry than was formerly required. This book, therefore, has been designed to meet the need in this regard. Incidentally, it may be noted that each alternate page is a blank one, so arranged for the purpose of enabling the student to record the results of the experiments conducted by himself. Interspersed, also, throughout the text are questions, based upon the experiments described, and to these questions the student is instructed to write answers, as the work proceeds. The book is divided into seventeen chapters, with appendices, forming a complete guide to the practical study of the subject.

Proceedings of the Royal Society of Medicine.

SUPPLEMENT

(Vol. XI, No. 2, December, 1917).

NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.*—Ed.]

Histology of Medicinal Plants. By William Mansfield, A.M., Phar.D. With numerous illustrations; pp. xi + 305. Price 12s. 6d. net. New York and London: Chapman and Hall, Ltd., 1916.

The purpose of this book is to provide a practical scientific course in vegetable histology, and as the author truly affirms, "it contains much that is new." We know of no monograph in which the same ground is covered. Special attention is devoted to medicinal plants, because of their economic value and the importance of the group they constitute. The first part of the volume is exclusively confined to the description of microscopes and microscopic work, in their various bearings, identified with the subject. In Part II tissues, cells, and cell contents are dealt with; in Part III ten chapters are devoted to the histology of roots, rhizomes, stems, barks, woods, leaves, flowers, fruits and seeds. From this brief summary some idea may be gained of the scope of the work, the text of which is materially elucidated by the addition of 127 plates.

Theophrastus and the Greek Physiological Psychology before Aristotle. By George Malcolm Stratton, Professor of Psychology, University of California. Pp. 227. Price 8s. 6d. net. London: George Allen and Unwin, Ltd., 1917.

The present volume is divided into three parts. In the first, which consists of an introduction entitled "Theophrastus as Psychologist of Sense Perception, and as a Reporter and Critic of other Psychologists," Professor Stratton discusses the general value of Theophrastus's work "On the Senses," which he states is the most important source of our knowledge of the earlier Greek physiological psychology. Theophrastus's own doctrine upon the main topics of the *De Sensibus* (sense perception in general, the individual special senses, and pleasure and pain) is then discussed, and an exposition is given of Theophrastus's general method of exposition and of criticism in the *De Sensibus*. The second part contains the Greek text of the fragment *On the Senses*, with the translation on the opposite page. The third part consists of notes upon the translation and the text.

Les Anxieux : Étude clinique. Par les Docteurs Devaux et Logre. Préface du Dr. Dupré. Pp. xvi + 300. Price 4f.95. Paris : Masson et Cie, 1917.

This clinical monograph discusses anxiety as a symptom of numerous physical and psychical disorders, and emphasizes the importance of distinguishing between inherited and acquired forms of this neurosis. The various secondary reactions of anxiety are discussed *seriatim*, but most of them will be familiar to students of neurasthenia and psychasthenia. Some attention is devoted to the Freudian "philosophy," which is combated by Drs. Devaux and Logre, who believe that Freud has in large measure confused cause with effect, in other words, that his psychiatric phenomena are due to a primary inherited neurosis to which sexual disturbances are secondary. An attempt is made to distinguish the "anxious temperament" from such allied conditions as neurasthenia, melancholia and obsession; but there is difficulty in erecting boundaries where none have been set by Nature. In the section devoted to the treatment of anxiety English readers will be surprised to find the high value assigned to opium. "The remedy," say the authors, "*par excellence*, is opium: indeed the drug is almost a specific for anxiety." This eulogy, although afterwards somewhat qualified, is certainly not generally accepted in this country. The concluding chapter, entitled "L'Anxiété de Guerre," gives a brief survey of war neuroses. The volume would be improved by the addition of an index.

Les Plaies de Guerre du Poumon : Notes sur leur Traitement chirurgical dans la Zone des Armées. Par Pierre Duval. With illustrations; pp. vi + 143. Price 8f.80. Paris : Masson et Cie, 1917.

The mortality of recorded cases (3,453) of gunshot wounds of the chest is 20 per cent. That due to bullets is very considerably less than that due to shell or shrapnel. Bullet wounds are either immediately fatal as the result of a vascular lesion or are relatively benign. Complications due to sepsis are rare. The high mortality as the result of shell wounds is largely due to the advent of sepsis. It is higher in cases in which the metallic fragment remains embedded in the lung, than in those in which it traverses the organ: 60 per cent. of the deaths occur in the first two days. There is a second period of high mortality between the seventh and tenth days: in these cases death is almost always due to infection, the result of the fragments of clothing or of the bony framework embedded in the lung. When a wound in the lung is in direct communication with the outside of the chest, death may result from the continuous loss of blood, and in such cases it is hastened by transport. A fatal result from an intrapleural hæmorrhage is rare. At a later period a fatal hæmorrhage is usually due to ulceration by infection. Operative treatment is indicated in all cases of open wounds of the thorax accompanied by a persistent hæmorrhage. Delay is justifiable when the bleeding is intrapleural. The blood-pressure is the only guide to distinguish between a persistent intrapleural hæmorrhage and shock. If this drops steadily, operation is indicated however desperate the condition of the patient may be. The dangers of pulmonary infection are less than those of sepsis of the pleura, but the pleura is frequently infected from the lung, and it is this which constitutes the great danger of wounds of that organ. The sole prophylaxis against infection is the earliest possible removal of all metallic and other foreign bodies and, as far as possible, the cleansing or excision of the damaged tissues. A full description is given of the technique of the operative treatment of wounds of the lung associated either with an open or closed thorax.

Théorie de la Contre-Évolution ou Dégénérescence par l'Hérédité pathologique. Par le Dr. René Larger. With 16 illustrations; pp. xiv + 405. Price 7 f. Paris: Félix Alcan, 1917.

This work is the outcome of forty years' patient but frequently interrupted labour by a general practitioner whose aim is to establish the principle that apart from normal evolution there is an inheritance of pathological characters—counter-evolution or degeneration—which eventually leads to the extinction of species. The reason why zoologists and palæontologists have generally failed to accept this conception is that their attention is exclusively directed to the laws of normal inheritance. This monograph is therefore of topical interest in connexion with Professor J. G. Adami's recent Lumleian lectures at the Royal College of Physicians on "Adaptation and Disease." The author defines counter-evolution or degeneration as a disease first acquired and subsequently inherited, characterized by progressive diminution of the organism's resistance, and terminating in sterility and extinction of the individual and his offspring. This pathological progress is quite different from regression, reversive anomalies, and degradation, which belong to normal evolution. The consideration of this subject entails the new conception of comparative general palæopathology and to this the work is devoted, special attention being paid to the dystrophies of gigantism, under which a comparison is drawn between acromegaly and the skulls of the fossil man of La Chapelle-aux-Saints, of gorillas, and elephants.

SHELL SHOCK AND ITS LESSONS. By G. ELLIOT SMITH, M.A., M.D., F.R.C.P., F.R.S., and T. H. PEAR, B.Sc. Pp. xi + 135. Price 2s. 6d. net. Manchester and London: Longmans, Green and Co., 1917.

This little book comprises two parts, the first an exposition of so-called shell shock, the second a criticism, destructive and constructive, of the public attitude in this country towards "the malady of insanity." It begins with an account of the nature of shell shock—the reader is spared anything psychologically very profound—in which is emphasized not for the first time the important fact that the disorder is nothing new and involves no symptoms but what have already been met with in civil life. The two succeeding chapters deal with methods of treatment, and the author's predilections may be inferred from a couple of quotations. "The doctor does not flinch from the employment of the most searching methods of investigation, lengthy and often painful treatment." "In the investigation of the inmost secrets of a person's life . . . . there must emerge much that the patient finds unpleasant to relate." They set considerable value on a "real analysis" (not excluding dream interpretation), though at the same time they expressly avoid the word "psycho-analysis," preferring to use the word "psychological-analysis" as less provocative of acrimonious discussion. In the concluding part of the book, they pass to the needs of the civil population in the matter of mental ill-health, and discuss in turn asylum reform, the attitude of the medical profession, methods of making asylum appointments, and the dearth of research among asylum doctors; finally they touch on the financial and legal aspects of the reforms they advocate.

AN EPITOME OF MENTAL DISORDERS: A PRACTICAL GUIDE TO ÆTIOLOGY, DIAGNOSIS, AND TREATMENT, FOR PRACTITIONERS, ASYLUM AND R.A.M.C. MEDICAL OFFICERS. By E. FRYER BALLARD, M.B., B.S.Lond., Captain R.A.M.C.(T.). Pp. xv + 211. Price 6s. net. London: J. and A. Churchill, 1917.

In his preface the author states that this little book is not intended for students of medicine but for practitioners and assistant medical officers in asylums. The writer has aspired to produce a concise practical aid to the diagnosis and treatment of the more common varieties of mental disorders, as met with in general practice and lunatic asylums. The classification based upon supposed factors in ætiology given by Tanzi is adapted provisionally. Part I of the book deals with common types of insanity, and is divided into chapters upon states of excitement, states of depression, states of stupor, delusional states, states of mental enfeeblement; and chapters upon acute confusional insanity, alcoholic insanity, imbecility and paranoia, dementia præcox, epileptic insanity, general paralysis, gross cerebral disease, manic-depressive insanity, persecutory hypochondria, and senile insanity. In Part I all the subject matter is dealt with in dogmatic style, but the facts recorded therein should enable a label to be attached in the diagnosis of most cases of certifiable insanity. In dealing with the insanities little stress is laid upon the value of laboratory tests, such as the Wassermann reaction, as an aid to diagnosis, and the psychological meaning of manifestations is not discussed. In the second half of the book non-certifiable mental derangements and borderline psychoses are discussed from an objective point of view under the headings of hypomania and the manic-depressive diathesis, eccentrics and cranks, psychasthenia, masked epilepsy and automatism, thyroid psychoses, hysteria, constitutional immorality, shell shock and battle strain, and combined and atypical psychoses.

L'APPAREILLAGE DANS LES FRACTURES DE GUERRE. Par PAUL ALQUIER et J. TAUTON. With 182 illustrations; pp. 250. Price 8f.25. Paris: Masson et Cie, 1917.

The authors make special use of plaster of Paris bandages, particularly in the form of rings, to fix splints and also the brackets which they apply on either side at the level of the seat of fracture. The ends of the brackets are held firm by the rings of plaster bandage. The brackets are of two kinds: the one form fitted with slides so that the bracket may lengthen under the influence of weight extension — the "attelle métalique extensible à glissiéré." The other form of bracket is fitted with a spiral spring—"le ressort à boudin"—which thus forces apart the rings in which the ends of the bracket are fixed. In order to fix joints, such as the knee and elbow, strips of metal are applied on either side, the ends being embedded above and below in the plaster bandage rings. Various modifications of the original Thomas's knee-joint splint are especially used, also a form of crutch seat for temporary use after amputation through the thigh, and adaptation of the crutch used for fracture of the clavicle, &c. All the different apparatus applied to gunshot fractures of the upper and lower extremity are here fully illustrated.

THE GROWTH OF MEDICINE FROM THE EARLIEST TIMES TO ABOUT 1800. By ALBERT H. BUCK, B.A., M.D. With 28 illustrations; pp. xviii + 582. Price 21s. net. New Haven: Yale University Press; London: Humphrey Milford, Oxford University Press, 1917.

The present volume is the first to be published by the Yale University Press from the Williams Memorial Publication Fund, which has enabled the University to accept for publication medical treatises dealing with the historical and scientific aspects of medicine which, for business reasons, could not be published on a commercial basis. The object of the work, which is founded on the more exhaustive monographs of Neuburger and Haeser, is to set forth in an attractive form the essential facts of the history of medicine, a knowledge of which is, as a rule, lacking in the average medical graduate. In the subdivision of the history of medicine into various periods the writer has chosen the following classification which combines some of the features of both the Pagel and Neuburger schemes: (1) Primitive Medicine; (2) The Medicine of the East; (3) The Medicine of the Classical Period of Antiquity—the pre-Hippocratic Period of Greek Medicine; (4) The Medicine of the Hippocratic Writings; (5) The Alexandrian Period; (6) The Medicine of Galen; (7) The Medicine of the Middle Ages; (8) The Medicine of the Renaissance Period; (9) Modern Medicine. The work ends with the death of Frère Côme in 1781. Numerous figures illustrating the medicine of the period accompany the text. A list of the principal authorities in the history of medicine is appended.

THE TREATMENT OF DIABETES MELLITUS: WITH OBSERVATIONS UPON THE DISEASE BASED UPON THIRTEEN HUNDRED CASES. By ELLIOTT P. JOSLIN, M.D.Harv., M.A.Yale. Second edition. With illustrations; pp. xvi + 559. Price $4.50. Philadelphia and New York: Lea and Febiger, 1917.

Written primarily as an exposition of the Allen, or starvation, method of treating diabetes mellitus as applied in his own practice, Dr. Joslin's book, which was first published in 1916, has evidently filled a want, for a second edition has appeared within the year. This has been largely re-written, and contains some 120 more pages than its predecessor. The opportunity has been taken to answer questions raised by doctors and patients since the last publication, while a considerable amount of new matter has been included. The value of the volume ha been further increased by the record of cases mentioned in the earlier edition being brought up to date. It is interesting to note in this connexion that a new cause of death, inanition, now makes its appearance for the first time in Dr. Joslin's statistics. Although written principally from a clinical aspect, the scientific side of the subject is by no means neglected, and much of the most recent work of American pathological chemists bearing on diabetes is fully considered. Accounts of the altered chemistry of the urine, blood, respiration, &c., with the methods of investigation now generally employed, are given. The most striking innovations from the point of view of clinical medicine are the author's strong condemnation of the practice of administering alkalis to combat acidosis and coma, and the precautions he recommends before depriving diabetics of food in order to render the urine sugar-free, especially in severe and long-standing cases where there is a danger of serious acidosis developing. He is now averse to a preliminary fast of more than three or four days' duration; if that is not sufficient to control the glycosuria, he employs a system of intermittent fasting, in which fasts of diminishing length are separated by days on which a limited diet is allowed. Dr. Joslin points out that actual fasting is not always necessary and that in many instances the urine will become sugar-free if the carbohydrate intake is reduced and the allowance of fats and proteins is limited. Early diagnosis, fasting with subsequent careful regulation of the diet, and education of the patient so that he may carry out the directions given to him intelligently, are considered by Dr. Joslin to be the chief elements in the successful treatment of diabetes, and of these education of the patient is regarded as one of the most important. That this is so is shown by the fact that his book is dedicated to "the medical profession of the United States of America and her allies upon whom devolves the *training* of their million diabetics."

THREE CLINICAL STUDIES ON TUBERCULOUS PREDISPOSITION. By W. C. RIVERS, M.R.C.S., D.P.H. With 15 illustrations; pp. 272. Price 12s. 6d. net. London: George Allen and Unwin, Ltd., 1917.

The author deals with three common abnormalities met with in consumptives—viz., ichthyosis, strabismus, and nasal defects. The proportion of ichthyotics among phthisical subjects, some 1,600 of whom were analysed by the author, works out at 1·4 per cent., whereas 500 non-tuberculous subjects yielded only one ichthyotic (0·2 per cent.). The existence of ichthyosis or a pronounced xerodermia is regarded as being indicative of a tuberculous tendency. Similarly, among 500 sputum-positive consumptives six squinting patients were discovered (1·2 per cent.), whilst among 900 controls there were only four squinters (0·4 per cent.). Concomitant strabismus would appear to be "sometimes a mark of mental deficiency, or of a tendency, personal or familial, to certain bodily anomalies or malformations." Three-fourths of the book is occupied with an account of nasal abnormalities in relation to consumption. The literature of the subject is fully analysed, and the author has taken 500 consumptives as the basis of his own inquiry. He finds that various nasal defects occurred 344 times (68 per cent.), as against 167 times in 452 of the non-tuberculous (36 per cent.). The importance is urged of a thorough rhinological examination of every suspected case of pulmonary tuberculosis at the time of the first consultation. When these three stigmata of predisposition—intranasal lesions, ichthyosis, and squint—coincide with an early sign of consumption, it "has been the writer's practice to diagnose phthisis at once." Incidentally, two early signs of phthisis that have received comparatively scant attention are fully described—viz., drooping of the shoulder-girdle on the affected side, and tenderness on percussion over the affected apex. The principal causes of the nasal obstruction commonly seen in consumptives are stated to be deviated septum, dislocated septal cartilage, septal spurs and ridges, and enlarged inferior turbinals. The incongruity is pointed out of giving sanatorium treatment and at the same time of neglecting to take notice of such things as mucopurulent nasal discharges. The main clinical details of the 500 consumptives forming the chief material studied are given in tabular form at the end of the book. There is no index.

THE JEWISH CHILD: ITS HISTORY, FOLKLORE, BIOLOGY AND SOCIOLOGY. By W. M. FELDMAN, M.B., B.S.Lond. With an Introduction by Sir JAMES CRICHTON-BROWNE, M.D., D.Sc., LL.D., F.R.S. With 21 illustrations; pp. xxvi + 453. Price 10s. 6d. net. London: Baillière, Tindall and Cox, 1917.

The physiology of the Jew is a subject of perennial interest, whether considered from the standpoint of his relationship to his contemporaries, from that of the reconciliation of modern hygienic conceptions with Rabbinical and Talmudical teachings, or from the pathological—the curiosities of medicine, such as amaurotic family idiocy, which appear to be confined to members of the race. The scheme throughout Dr. Feldman's book is to provide chapter and verse for the basis of many traditional precautions and regulations, traditions which, although their origin has long since been forgotten, have been handed down through generation after generation with a whole-souled enthusiastic faith that such precepts anticipated, perhaps by thousands of years, the most modern discoveries and the teachings of to-day. The author has aimed at making his book encyclopædic in character, and the Jewish child is considered under the headings—the ante-natal, natal, and post-natal epochs—so that the subjects embraced are those of embryology, pregnancy, heredity, obstetrics, infancy, childhood, and adolescence, with all their associative physiology, hygiene, and pathology. Interspersed are numerous illustrative fables and anecdotes, which disclose the inner or symbolical significance of practical observances, all of which cannot fail to interest the Gentile reader, and many of which must be comparatively unknown to members of the chosen people. For example, it is customary in many synagogues at one of the festivals (Tabernacles) for pregnant women to bite off the tip of the citron which is carried round during the ceremony, and Dr. Feldman, quoting from the Talmud, traces this custom to the practice of a certain queen, who in consequence of eating citrons during her pregnancy gave birth to a daughter with an exquisite personal perfume. In his chapter on Jewish heredity, the author gives the conclusions of Dr. (now Captain) Redcliffe Salaman, originally published in the *Journal of Genetics* in 1910. Dr. Salaman, struck by the opportunity of utilizing the Jewish physiognomy as a recognizable character, investigated the children of 136 mixed marriages between Jew and Gentile, and came to the conclusion that on Mendelian lines the Jewish physiognomy is a recessive character. This conclusion Salaman supports by the publication of photographs, a plate which is reproduced in the present volume. The final chapter deals with the biostatic and physical characters of the modern Jewish child, with a liberal quotation of vital statistics culled from accepted authorities.

THE BATTLE WITH TUBERCULOSIS AND HOW TO WIN IT; A BOOK FOR THE PATIENT AND HIS FRIENDS. By D. MACDOUGALL KING, M.B. With eight illustrations; 258 pp. Price 6s. net. Philadelphia and London: J. B. Lippincott Co., 1917.

After an experience of eighteen months as a patient at sanatoria in Canada and the United States, and a residence of two years in a health resort, the author of this book may justly claim to speak from inside knowledge of the mental attitude of the phthisical patient towards his malady. Choosing the familiar metaphor of a battle between man and his great enemy, the tubercle bacillus, each chapter, written in a simple, almost conversational style, contains plain hints, warnings, and words of encouragement for all sufferers from tuberculosis. The difficulties of early diagnosis, the reluctance of patients in the incipient stage to believe that there is anything seriously wrong at all, the aims and objects of sanatorium life are among the principal topics dealt with in the first portion of the book. The second part is occupied with details of home treatment, the elements of dietary, the formation of habits of self-discipline, the use of special weapons, such as tuberculin, artificial pneumothorax, &c. The two latter are regarded rightly as "in no sense a substitute for rest, and must never be a balm for impatience." The three cardinal principles of treatment —rest, fresh air, and good food—are insisted upon, and the folly of taking patent medicines is judiciously pointed out. Methods for the destruction and disinfection of sputum, infected clothes, and eating utensils are given in an appendix. The average consumptive patient will find in this volume the answers to most of the questions that disturb his mind with regard to the nature and methods of treatment of his complaint in which, more than in any other, "physical restoration is dependent upon moral victory."

ENCYCLOPÆDIA MEDICA. Second edition. Under the General Editorship of J. W. BALLANTYNE, M.D., C.M., F.R.C.P.E. Volume V, Filix Mas to Heart. Illustrated; pp. viii + 766. Price 20s. net. Edinburgh and London: W. Green and Son, 1917.

In this volume of the second edition of the Encyclopædia Medica new articles have been introduced on the fœtus, first-aid, "gassing," gynæcological diagnosis, and graphic methods of examining the heart. All the old articles have been revised and several of these re-written —namely, those on food, gangrene and gas gangrene, gout, hæmatoma auris, hæmophilia and surgery of the heart. The new article by Dr. Mathewson on "Graphic Methods of Examining the Heart" is illustrated by five plates of electro-cardiogram tracings. Nearly one-third of the volume is taken up with a description of the heart and its diseases. The article on the fœtus, by Dr. Ballantyne, extends to 60 pages and contains much new material. There are numerous plates and ilustrations in the text. Among those that are new, in addition to the electro-cardiogram tracings already mentioned, are the coloured plates illustrating foot-and-mouth disease in the human subject, and grasses the pollen of which is liable to produce hay fever. The majority of the writers being Edinburgh men the book largely reflects the views and teaching of the Edinburgh School. Bibliographies and lists of references are attached to many of the articles.

STUDIES IN THE HISTORY AND METHOD OF SCIENCE. Edited by CHARLES SINGER. With 41 plates and 23 illustrations in the text; pp. xiv + 304. Price 21s. net. Oxford: The Clarendon Press, 1917.

Sir William Osler, who has written the introduction to this work, states that it is the outcome of a quiet movement on the part of a few Oxford students to stimulate a study of the history of science. The volume consists of a number of essays, most of which when war was declared were in preparation by Dr. Charles Singer, Dr. Raymond Crawfurd, Dr. E. T. Withington, the late Dr. J. W. Jenkinson, Mr. Reuben Levy and Mr. F. C. S. Schiller. In his "Study of the Scientific Views and Visions of St. Hildegard (1098-1180)" Dr. Singer records her life and works and sources of scientific knowledge. From a very early age she appears to have been subject to trances and visions, the pathological basis of which seems to have been migraine. In some remarkable coloured plates, probably prepared under her supervision to illustrate the description of her visions and reproduced in this essay from the Wiesbaden codex, scintillating scotoma and fortification lines can easily be recognized. Dr. Singer also contributes an essay on Early Renaissance Anatomy, in which he gives an account of the study of anatomy in the fourteenth and fifteenth centuries, devoting special attention to anatomists of Bologna, particularly Hieronymo Manfredi, the text of whose "Anothomia" is here transcribed and selected passages translated by Miss Wilfred Westland. In a paper on the "Blessing of Cramp-Rings," Dr. Raymond Crawfurd deals with the ceremony of blessing rings for the cure of epilepsy and other spasmodic disorders by the Kings and Queens of England. The practice appears to date from the time of Edward the Confessor and fell into disuse with the death of Queen Mary Tudor. The "rheumatism ring" of to-day, in Dr. Crawfurd's opinion, is the lineal descendant of the cramp ring of former times. In an article on Dr. John Weyer, the first serious opponent of the witch mania which was rife in the latter half of the sixteenth and early part of the seventeenth centuries, Dr. E. T. Withington gives a graphic description of the appalling cruelty and absurd credulity of the witch hunters. Mr. Reuben Levy writes on the "Tractatus de Causis et Indiciis Morborum," attributed to Maimonides, to prove that the supposed author never wrote any such compendium. The remaining essays in the volume are on "Vitalism," by the late Dr. J. W. Jenkinson, the well-known embryologist, and "Scientific Discovery and Logical Proof," by Mr. F. C. Schiller.

Proceedings of the Royal Society of Medicine.

SUPPLEMENT

(Vol. XI, No. 3, January, 1918).

NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.*—Ed.]

On Causation, with a Chapter on Belief. By Charles A. Mercier, M.D., F.R.C.P., F.R.C.S. Pp. xii + 228. Price 4s. net. London: Longmans, Green and Co., 1916.

The writer discusses the theories of causation as advanced by Hume, Mill, Welton, Karl Pearson, and others, and finds them all faulty. Mill's treatment of the subject is a deplorable muddle. The common-sense view (which Hume attempted to demolish) is defended—the view, i.e., that causation implies the idea of *power* or *necessary connexion* between the cause and the effect. The terms—effect, reason, result, cause, condition, are defined. The writer defines causation as "the necessary connexion between an action and a sequent change, or accompanying unchange in the thing acted on." The law of the uniformity of nature as stated in the text-books he regards as nonsense, inasmuch as neither the same cause nor the same effect is ever repeated. The methods of ascertaining causes, as also errors in attributing causation, are discussed in detail. The eighth chapter treats of the causes of death and insanity; the final chapter is devoted to a discussion on the nature of belief.

The Principles of Acidosis and Clinical Methods for its Study. By Andrew Watson Sellards, Associate in Harvard Medical School, Department of Tropical Medicine. Pp. vi + 117. Price $1.00. Cambridge, Mass.: Harvard University Press, 1917.

This volume presents an analysis of the theory of acidosis. The work of various observers is passed in review, and a bibliography of seventy-one references is appended. The author defines acidosis as a depletion of the blood and other tissues in fixed bases. The distinction between the normal and a state of acidosis is said to be quantitative and not qualitative, the immediate cause of death being probably due to lack of normal carbonate for carrying on internal respiration. The determination of the tolerance to sodium bicarbonate is the most delicate test for all types of acidosis and is pathognomonic. In conjunction with observations on the reaction of the blood to phenolphthalein, this test showed that moderate acidosis develops comparatively in some of the chronic nephritides. The high tolerance to bicarbonate in advanced nephritis has been found essentially due to an acidosis. The conditions in which severe acidosis occurs are detailed and contrasted. As regards treatment, the relief of symptoms is stated to be due, not to the neutralization of acid but to the persistence of the injected carbonates in the body, and to their function in carrying carbon dioxide from the tissues to the lungs. The ætiology of the known acidosis is dealt with, and the points arising in this monograph on which information at present is incomplete are mentioned, as well as diagnostic methods, relative value of various tests, occurrence, therapy, and differential diagnosis.

THE CONDUCTION OF THE NERVOUS IMPULSE. By KEITH LUCAS, Sc.D., F.R.S. Revised by E. D. ADRIAN, M.B., M.R.C.P. With diagrams; pp. xi + 102. Price 5s. net. London: Longmans, Green & Co., 1917.

This latest addition to Longman's series of monographs on physiology should prove a great boon to workers in the field of neurology. The book is founded upon the "Page May" lectures delivered at University College, London, in 1914, by the late Keith Lucas, who gave his life for his country, dying after an aeroplane accident on October 5, 1916. Professor Starling had arranged with Lucas that these lectures should appear in book form as a monograph, but July, 1914, found the writing still incomplete for only eleven out of thirteen chapters had been completed. At the outbreak of war, Lucas offered his services and was posted to the Royal Aircraft Factory at Farnborough. From that time until his death, his work was concerned solely with the problems of flying. The revision of the book for press we owe to Dr. E. D. Adrian, Lucas's co-worker, pupil and colleague, who has re-written the greater part of Chapter VI and the whole of Chapter XIII. The book comprises thirteen chapters dealing with: The measurement of the nervous impulse; the effect of strength of stimulus on the impulse; the recovery of a nervous impulse which has been reduced; the class of disturbance to which the impulse belongs; the effect of incomplete recovery after previous conduction; the supernormal phase; summation in central and peripheral tissues; attempts to explain summation; conduction in junctional tissues; the time interval at which two nervous impulses give summation; the phenomena and explanation of "apparent inhibition" in peripheral tissues; central inhibition. Throughout the book the experimental genius and the analytical mind of Lucas is revealed. The co-relation of the phenomena which occur during the passage of a nervous impulse through peripheral structures, junctional tissues and the central nervous system is brought prominently to the fore. Lucas moreover shows how the phenomena seen in regions of decrement render many of the complex problems observed in the intact organism more easy of comprehension. All who are interested in the phenomena seen in living matter will find much of interest in this book.

PLAIES DE LA PLÈVRE ET DU POUMON. Par R. GRÉGOIRE et A. COURCOUX (Collection Horizon). Illustrated; pp. 212. Price fr. 4.40. Paris: Masson et Cie, 1917.

This book is written in text-book style, and the pathology, the symptoms, the complications and treatment of the various lesions are described in full detail. It is divided into three parts: The first deals with wounds of the pleura and of the lung without infection. The authors have done a considerable amount of clinical and experimental work on the question of the coagulability of the blood in hæmothorax. After the first five hours, in an aseptic hæmothorax, the blood does not clot either in the pleura or after withdrawal. There is, however, a deposit of a fine fibrous reticulation on the surfaces of the pleural membranes. Clotting occurs only when there has been an extensive loss of the endothelial lining or a secondary infection. They suggest the possibility of the presence of some substance not yet determined which is antithrombotic in character. In about 10 per cent. of the aseptic cases the blood is fairly rapidly absorbed, but in the others it becomes complicated between the tenth and fifteenth day by a simple serous or sero-fibrinous pleurisy.

In a few cases, there is neither absorption by nor reaction of the pleura and hæmolysis of the blood takes place. No surgical intervention is advocated when the symptoms are not urgent and there is evidence that the blood is in process of absorption. But if the hæmothorax is stationary, or is increasing, simple puncture with a trocar and cannula is indicated. If the intrathoracic wound is still bleeding, the blood withdrawn on puncture will coagulate and operative treatment is necessary. The authors are by no means satisfied that the immediate removal of all foreign bodies from the lungs and the pleura is the most satisfactory method of treatment. In Part II, the symptoms and treatment of wounds of the lungs and pleura complicated by infection are discussed. Part III is devoted to the consideration of the later intrathoracic changes which may take place as a result of interpleural or intrapulmonary fibrosis, or of the persistence of foreign bodies, or of the supervention of tubercle, or of delayed sepsis.

LORD LISTER. By Sir RICKMAN JOHN GODLEE, Bt., K.C.V.O., M.S., F.R.C.S. With 33 illustrations; pp. xix + 676. Price 18s. net. London: Macmillan and Co., Ltd., 1917.

Sir Rickman Godlee has in this book given the authoritative commentary and supplied the notes necessary to explain the "Collected Papers" published in 1909, which form the perpetual monument to Lord Lister's memory. He has been able to do so owing to his relationship and by acting as Lister's surgical assistant, aided by Lister's manuscripts, common-place books, and the correspondence with his father, brother, and others. Moreover, Sir Rickman Godlee has included references to the history of surgery bearing on Lister's work, preceding and during his establishment of his antiseptic system, with some indication of the further developments which that system has since undergone. Lister discovered, invented, and established the antiseptic system as an entire innovation at a time when, within the limited range of the practice, there was no fixed plan governing surgical procedures in general. Hitherto, the main consideration at a surgical operation had been speed, and this had been hardly modified at all by the introduction of general anæsthesia, which merely encouraged operations without improving the results. Any method of carrying out a surgical operation scarcely included more than what was based on anatomical considerations. The term "cleanliness" was often on the lips of surgeons, but custom caused all sorts of filthiness to be overlooked, whether in the personal habits of the surgeon, nurse and patient, in the disposal of the dejecta, or in the burial of the dead. There was no adequate protection against the spread of infection from one patient to another; the surgeon might transfer infection on his hands or instruments from a previous operation, from the dissecting room, or mortuary. Scarcely any wounds, except those on the face, could be sutured; the dressings most in vogue, waterdressings and poultices, favoured decomposition; erysipelas, pyæmia, hospital gangrene and maggots infested all the large hospitals; materials now recognized as antiseptics, including chloride of zinc, chlorine water, iodine, perchloride of mercury, and indeed carbolic acid, had all been used by one or another in a haphazard fashion; either the solutions were too weak, or too strong, or caused irritation owing to impurities. Opposition to Lister came from surgeons who employed empty phrases about the constitutional origin of inflammation and other diseases. The practice of such surgeons was not only limited but they dared not extend it owing to the certainty of failure. In their eyes the suture of a fractured patella or the free opening of a psoas abscess was not only unheard of but unjustifiable. They dared not practise in the large hospitals such operations as the excision of varicose veins or varicocele, or the suture of the hernial orifice, and even outside these infected places such operations involved the greatest risk of a fatal issue. The antiseptic system was established by Lister in spite of all opposition, and his pupils and those who had visited him and had seen his results, initiated his system in all surgical centres after such a fashion that the opposition of the older surgeons was killed by the falling away from them of their previous opportunities.

Lister was happy in being born to easy circumstances, which freed him at the commencement of his career from the sterilizing effect of having to "coach" for a living; he was able to begin from the first and to continue original experimental work, to travel and to change his residence from Edinburgh to Glasgow, from Glasgow back to Edinburgh, and from thence to London, without being tied to one city by the necessity of ensuring a continuity of private practice. He had the advantage of a father who had taken a great part in the improvement of the microscope, by means of which cells came to be distinguished and micro-organisms to be recognized. His father provided him with the best general education, a sufficient classical course, so that he took the B.A. degree, an acquaintance with natural history which awoke in Lister a desire to become a surgeon, and he sent him to University College, London, for his medical course, where his teachers included the best of the time. His father up to an old age took an active and intelligent interest in his son's work, as is amply shown by the letters which passed between them. At University College Lister took his medical degree, and gained the posts of both House Physician and House Surgeon. He was stimulated, even during this period, to commence original observation with the microscope, under the influence in particular of Wharton Jones and Sharpey. His descriptions of unstriped muscle cells, including those of the arterial walls, of the changes in the cutaneous pigment cells of the frog, and of the earliest stages of inflammation, were original and good. He entered upon the very complex subject of the coagulation of the blood, concerning which he cleared away many false notions; it led him gradually on to questions relating to decomposition, fermentation and his early bacteriological experiments; also the consideration regarding blood clot in wounds influenced him in designing his earlier methods of dressing wounds. This experimental work, which had been described in papers read to the Royal Society, brought about his election and his appointment to give the Croonian Lecture. A visit to see Syme's surgical work in Edinburgh was the commencement of Lister's connexion with Syme. He became Syme's house surgeon, then his surgical assistant, and he married Syme's daughter. At the age of 33 Lister had established a reputation as the most prominent among the rising teachers of surgery in Edinburgh, both on the scientific and practical side, hence it was that he gained the appointment of Regius Professor of Surgery in Glasgow University, although he was aided by his father's position in relation to the Fellows of the Royal Society and by friends who joined in bringing Lister's candidature under the notice of the Crown. He had, however, to wait a year before he was appointed Surgeon to the Infirmary, where his movement for very urgent sanitary reforms met with much opposition, although now the memory of his time of office is the most glorious incident in the history of that institution. Between 1860 and 1865 Lister described several improvements in practical surgery, excision of the wrist, elevation of the limb before applying the tourniquet, and his class of students rapidly increased. But the continual occurrence of pyæmia and hospital gangrene forced him to concentrate attention on decomposition in wounds, and having by chance heard of the use of carbolic acid in sanitation he applied an impure form of the material to the wound caused by a compound fracture of the leg: he had not then heard of Lemaire's employment of this remedy, which indeed had already lapsed into disuse. Nor until 1865 had Pasteur's work come much under Lister's notice; Pasteur was then known chiefly to chemists, brewers and winegrowers through his work on fermentation, and that concerning the differences in tartaric acid crystals. Pasteur had already shown that decomposition was due to organisms, which disposed of the previous notions as to the cause of decomposition through the oxygen or other gaseous substance in the air. On becoming acquainted with Pasteur's experiments, Lister followed his example and commenced observations especially as regards lactic acid fermentation. In order to prevent organisms from infecting wounds Lister directed his particular attention to infection from the air as the source. The preoccupation with the air as the origin of infection received support in various ways, from Tyndall's observations concerning the particles of dust in the sunbeam, the experience of surgeons practising so-called subcutaneous tenotomy, the decomposition supervening after the opening of an empyema, all influenced the earlier inventions made by Lister for the dressing of wounds, including the much debated spray. As one improvement followed another in his method of dressing wounds until his antiseptic system became definitely established, opposition was directed especially upon two points. In the narrow-minded view of some Lister had simply introduced another application, carbolic acid, as an addition to others previously in use for wounds which, when employed without regard to precautions already laid down by Lister and without being combined with the other details of his system, afforded no advantages, and being misused became the source of harm. These opponents quite failed to understand that Lister had introduced a system of antisepsis which events proved was independent of the use of carbolic acid. Another set of opponents, at the head of whom was Lister's colleague in Edinburgh, Simpson, employed the vague term "Hospitalism." They condemned all large hospitals, which they would have pulled down, and have all surgery and midwifery conducted, whether in newly-constructed buildings, cottage hospitals or private houses. The fallacy in their arguments was shown when infection broke out as soon as a new hospital was opened, or when a lying-in institution was re-opened after being closed for months.

The revolution in the results obtained in hospitals followed upon the establishment of Lister's antiseptic system, supplemented by the general improvement in hospital sanitation, and by the development of nursing under Miss Nightingale's influence. The first of Lister's original procedures to be varied was that of the use of the spray. It was opposed as unnecessary, and, indeed, harmful by ovariotomists who, in operating outside large hospitals, were much less exposed to the danger of infection. Instead of it free irrigation by a sublimate solution was adopted ; also iodoform was introduced as a means of placing a slowly dissolving antiseptic in a wound, and so escaping the danger of carbolic acid or mercurial poisoning when any quantity of these solutions was retained in a wound. The beneficial effect of iodoform became evident in connexion with operations on the tongue, the dressing of foul abscesses, and suppurating tuberculous lesions. Apart from this, as the major portion of surgical practice had to do with wounds previously non-infected, the so-called aseptie system arose ; no antiseptic was used, the wound was made as dry as possible, and the lessened serous discharge allowed of drainage being dispensed with. The experience of the South African War in a dry climate where the soil was uncontaminated by manure, and the relatively favourable character of the wounds caused by rifle bullets supported the aseptic system, but with the opening of the present War it was necessary to return to the antiseptic system because all the wounds were infected from the first. The primary sterilization of the wound by undiluted carbolic acid had the objection that much dead tissue remained in the wound so that infection was merely delayed in its onset. Hence a modified antiseptic method has prevailed, the paring away of the dead and infected margins of the wound, followed by continuous irrigation with weak antiseptic solutions, or the insertion into the wound of a slowly-dissolving antiseptic, not likely to cause poisoning. The possibility of infection through the surgeon's hands had been first raised by Semmelweiss, who made the students coming from the dissecting room or mortuary wash their hands in chlorine water before undertaking midwifery. He was opposed, not only by obstetricians, but by others in Germany, even by Virchow, and when he died in a lunatic asylum his ideas were treated as having emanated from a disordered brain. Lister prescribed a careful washing of the hands, followed by frequent lavings in carbolic acid. Dissatisfaction arose, either because of personal habits not being so particular as were Lister's, or because the hands of others could not bear contact with the antiseptic so well, and, indeed, there was danger in the case of a busy surgeon of transferring infection when he had to operate upon one case after another. A great number of experiments were made, and all kinds of alternative methods proposed, without any having a clear ascendency over Lister's careful precautions, until the use of rubber gloves was introduced from America. As for the skin of the patient Lister had been content with a simple washing, followed by rubbing with carbolic acid solution immediately before the incision, whilst during the operation the skin was kept moistened by the spray. Whether on account of the skin being insufficiently washed, or the carbolic acid causing irritation along the line of stitches, a more elaborate preparation came into vogue, and the so-called guard covered the area of the operation. The procedure involved much discomfort to the patient, and happily it was found possible to return to the simpler method of Lister, with this variation, that a weak non-irritating solution of iodine replaced the carbolic acid. An insidious cause of wound infection was due to Lister's revival of the employment of catgut in order to gain an absorbable material. Lister's earlier attempts to sterilize catgut proved uncertain ; it was not until he invented the sulphochromic preparation of catgut, which could afterwards be preserved in 5 per cent. carbolic acid, that he obtained a reliable material. Probably catgut so preserved is as reliable as after any one of the many other proposals which have since been put forward, but exceptionally a strand remains infective whatever the preparation. Lister showed extraordinary perseverance, and a faculty of invention in the preparation of his dressings, the "carbolic gauze," and "sal-alembroth wool," the "pink" and the "green protective," and especially in the chemical experiments, which ended in the production of the "double cyanide gauze." The development of the method of sterilizing plain materials by means of steam under pressure, introduced by Schimmelbusch, superseded Lister's dressings, in particular because of the saving in cost, although there remain certain cases in which Lister's materials still have the advantage. Lister was most careful in cleaning his instruments and sponges, and these were not put into the carbolic acid solution until absolutely clean. Neglect of this resulted in the carbolic acid causing the dirt enclosing the germs to become caked. Hence there was gained an advantage by the introduction of boiling in a weak solution of bicarbonate of soda for such instruments as would bear boiling; the hot bicarbonate of soda solution remedied any neglect to clean the instrument beforehand. But for instruments and apparatus which cannot be so boiled or sterilized by steam under pressure Lister's prescriptions still hold good.

From Glasgow Lister had returned to Edinburgh, where he had the largest and most intelligent class to instruct, and from which his pupils passed out to spread his antiseptic system the world over. In spite of being in the most enviable of surgical posts he decided to remove to London, having chiefly in view a still wider extension of the knowledge of his system. Unfortunately he was appointed to a makeshift hospital, with the charge of only a few beds, the title of professor was merely nominal at a very small recently founded medical school. Most of the medical students were wholly concerned in passing examinations; Lister's teaching was as much above the heads of the examiners as above those of the examinees. But the change to London brought Lister into closer connexion with the Fellows of the Royal Society, a numerous clientèle from Edinburgh had come south to practice, and his reputation now placed him at the head of the surgical profession. The International Medical Congress in 1881 marked the general acceptance of the antiseptic system. In subsequent years Lister gave many public addresses and lectures. Among the later events of his life was his tenure of the Presidency of the Royal Society. He was the principal figure after Pasteur at the celebration of the latter's jubilee in 1892, and when Lister had delivered his address before the great assembly at the Sorbonne, Pasteur rose and embraced him. In 1870, whilst at Edinburgh, Lister had been appointed Surgeon in Ordinary in Scotland, succeeding Syme; in 1871 he opened an axillary abscess, under an ether spray, for Queen Victoria, who was then at Balmoral; in 1878 he became Surgeon in Ordinary to the Queen; he was made a Baronet in 1883 and in the New Year of 1897 he was raised to the Peerage; he succeeded Sir James Paget as Sergeant Surgeon to the Queen in 1900. As such he was present at the consultation previous to the operation on King Edward by Sir Frederick Treves, and on the King's Coronation, when the Order of Merit was instituted, he was one among the original twelve members. In all his public addresses and speeches, including those made in the House of Lords, Lister exhibited a wide knowledge and a judicial acquaintance with the many questions relating to Public Health arising out of recent advances in pathology. If, indeed, one sentence more than another gives expression to the life of Lister as a whole it is Michael Foster's epigram: "In early life Lister belonged to a Society the members of which called all men Friends, and now in turn, because of his beneficence and service to mankind, all men the world over call him Friend."

Proceedings of the Royal Society of Medicine.

SUPPLEMENT

(Vol. XI, No. 4, February, 1918).

NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.*—Ed.]

Britain's Heritage of Science. By Arthur Schuster, F.R.S., and Arthur E. Shipley, F.R.S. With 15 portraits; pp. xv + 334. Price 8s. 6d. net. London: Constable and Co., Ltd., 1917.

The main purpose of the present work has been not to give a complete history of British science but to lay stress on its salient features. The first seven chapters, which are written by Dr. Schuster, deal with the history of the physical sciences in Britain. Chapter I, which is entitled "The Landmarks of Physical Science," contains an account of the work of Roger Bacon, Gilbert, Napier, Newton, Dalton, Young, Faraday, Joule, William Thomson, and Clerk Maxwell. In the following six chapters Dr. Schuster describes the contributions made to physical science in and outside the universities during the seventeenth, eighteenth and nineteenth centuries, the applications of physical science to industry, and the history of the Royal Society and other scientific institutions. Chapters VIII-XI, which are from the pen of Dr. Shipley, deal with the history of biological science in Great Britain, Chapter VIII being devoted to biological science in the Middle Ages, and the remaining three chapters to botany, zoology, and physiology respectively. The work concludes with a chapter on geology, in which is traced the progress of English geology from Hutton to Prestwich. The text is illustrated by reproductions of portraits from the Royal Society, Royal College of Physicians, British Museum, and private collections.

The Road to a Healthy Old Age. By T. Bodley Scott, M.R.C.S.Eng., L.R.C.P.Ed. Pp. 190. Price 4s. 6d. net. London: T. Fisher Unwin, Ltd., 1917.

This book is an amplification of a small work on the same subject published by the author some years ago. The reception of the latter was so favourable that it led him to embark upon his present extended dissertation. The subject is dealt with in five chapters, respectively entitled: "The Prolongation of Life," "On the Value and Digestibility of Foods," "The Prolongation of Health," "The Treatment and Prevention of Premature Senility," and "Chronic Bronchitis and Bronchial Asthma." Upon all these points the author describes his own experience, discussing it in *causerie* fashion, in the course of which there are many quotations from Mr. Balfour, Cicero, Horace, Whittier, Cato, R. L. Stevenson, William Penn, and a host of others. There are many quotations, too, from medical writers, supporting the views expressed. The author shows a full acquaintance with the newest remedies, and freely discusses their value and drawbacks, where old age is concerned. He thinks the future of therapeutics lies chiefly in the direction of organic remedies, especially emphasizing in this connexion the value of thyroid gland in cases of arteriosclerosis. He holds that there is a pre-sclerotic stage in this disease, evidenced by raised tension, but without any discoverable real organic changes. He is in agreement with the late Sir Victor Horsley that "senility is due, at any rate in part, to thyroid degeneration." Illustrative cases of the treatment recommended and adopted by the author are interspersed in the text. No index accompanies the volume.

THE THEORY AND PRACTICE OF MASSAGE. By BEATRICE M. GOODALL-COPESTAKE. With 56 illustrations; pp. xvi + 251. Price 8s. 6d. net. London: H. K. Lewis and Co., Ltd., 1917.

Since 1900, the year of the incorporation of the Society of Trained Masseuses, a great advance has taken place in the professional position of massage as an aid to treatment. It is now firmly established upon a scientific basis, and the volume before us is ample testimony to the progress made, during recent years, in this important branch of therapeutic practice. The author deals comprehensively with the whole subject, in the form of a work which will serve its purpose, not only as a students' *vade mecum*, but also as a guide to medical men desirous of gaining knowledge of the Protean forms in which massage, as a method of treatment, is indicated. In Part I, the history, hints to beginners, massage manipulations, the physiological effects of massage, and the technique generally of the subject, are dealt with; Part II is devoted to the surgical conditions treated by massage, with details of application; in Part III the medical conditions are similarly explained. An appendix, containing examination questions set by the Incorporated Society of Trained Masseuses, a glossary of medical terms, and a full index, complete the volume. The illustrations, explanatory of the text, are a useful feature of the work.

NUTRITION AND CLINICAL DIETETICS. By HERBERT S. CARTER, M.A., M.D., PAUL E. HOWE, M.A., Ph.D., and HOWARD H. MASON, A.B., M.D. Pp. xvi + 646. Price $6.00. Philadelphia and New York: Lea and Febiger, 1917.

This is a complete text-book of dietetics which deals with the whole subject of food and nutrition on modern scientific lines. Part I discusses the physiology of digestion, and the metabolic requirements of the body in energy, protein, and mineral matter. It contains also a useful chapter on the economics of food. In Part II the composition, digestibility, &c., of the different foods are considered in detail. Part III deals with the important subject of infant feeding, whilst the fourth and largest part of the book is devoted to the consideration of the dietetics of disease. The concluding chapter contains useful and elaborate tables of food values and weights and measures. The whole book is full of information, and certainly embodies the latest knowledge on the subject with which it deals.

A COMPLETE SYSTEM OF NURSING. By A. MILLICENT ASHDOWN. With 8 plates and 251 illustrations in the text: pp. xv + 746. Price 10s. 6d. net. J. M. Dent and Sons, Ltd., 1917.

Nurses may now be said to be confronted with an *embarras de richesses* of works provided for their instruction. To some extent this is due to the number of those engaged in teaching the principles and practice of nursing. Small elementary manuals in which the line of separation between medicine and nursing is sharply defined are now insufficient for the purpose, and the output of this class of professional literature is distinguished by volumes of some size. These generally contain so many hints of up-to-date medical detail as to constitute, presumably, quite useful works of reference for medical practitioners, whose knowledge may have suffered in consequence of the lapse of time and want of opportunity to maintain it. The book before us is one of this type; although the object from the nurse's point of view is rigidly maintained, it nevertheless contains much practical medical information calculated to place a medical man at some discount, if he did not know it, before an up-to-date trained nurse who did. It is the largest manual of nursing we have yet seen; it maintains its title of being complete, while the author justifies, in full degree, her capacity as a teacher. The principal chapters deal with the following subjects: General Nursing Duties; Particular Methods of Treatment; the Application of Bandages, Extension and Splints; Medical Nursing; the Nursing of Specific Infective Diseases; the Nursing of Diseases of the Nervous System; First-Aid and After-Treatment of Accidental Wounds and Injuries; the Complications of Wounds; Surgical Nursing. Gynæcological and Obstetric Nursing are fully dealt with. There are also chapters on Anæsthetics, Massage, Electricity, Drugs and Poisons; Diet and Sick-room Cookery. The Appendix contains tables of the Metric System with English equivalents, and tables of hypodermic and antiseptic solutions. There is a very full index.

DISEASES OF CHILDREN. By EDWIN E. GRAHAM, A.B., M.D. With 89 engravings and 4 plates; pp. xx + 902. Price $6. Philadelphia and New York: Lea and Febiger, 1916.

The writer's aim has been to produce a thoroughly practical text-book on children's diseases, incorporating the most modern views on each subject. While, therefore, sufficient space has been given to pathology, a larger amount of the book is taken up by symptomatology, diagnosis, and treatment. A description of the diseases of the various systems is preceded by introductory chapters on the normal infant at birth, the normal development of the child, the clinical examination of sick children, infantile mortality, heredity, infant feeding, and normal digestion. The concluding chapter is devoted to the consideration of puberty, a subject which, lying as it does between childhood and adolescence, is treated fully neither in pædiatric text-books nor in treatises on general medicine.

POLIOMYELITIS IN ALL ITS ASPECTS. By JOHN RUHRÄH, M.D., and ERWIN E. MAYER, M.D. With 118 engravings and 2 plates; pp. viii + 297. Price $3.25. Philadelphia and New York: Lea and Febiger, 1917.

This monograph, representing the most modern conception of this disease, comes before the public almost simultaneously with that of Draper on the same subject, and both reflect the teaching of the Rockefeller Institute of Medical Research, New York, where Draper did much of his work. While the authors, as independent critics, regard Flexner and Noguchi's filterable virus—the globoid bodies—as the most probable causal factor, they accept Draper's conception of the disease as a general infection which may affect the nervous system, but often does not, and they give a full account of the treatment by immune serum originated by Flexner and his collaborators. In the interesting historical introduction the disease is considered to be of comparatively recent origin, the first recognizable description being that in "The Diseases of Children," by Michael Underwood, of London, in 1784, entitled "On Debility of the Lower Extremities." The title-page and some illustrations from the first monograph on the subject by Jacob Heine are introduced, and explain the synonym Heine-Medin disease. The whole subject is very completely dealt with, and special attention is paid to the orthopædic and late treatment by exercises of the paretic parts. Like other portions of the work this essentially practical section is well illustrated by figures.

THE BASIS OF SYMPTOMS: THE PRINCIPLES OF CLINICAL PATHOLOGY. By Dr. LUDOLPH KREHL. Authorized translation from the seventh German edition by ARTHUR FREDERIC BEIFELD, Ph.B., M.D. With an Introduction by A. W. HEWLETT, M.D. Fourth American edition. Pp. xviii + 540. Price 21s. net. Philadelphia and London: J. B. Lippincott Co., 1917.

This new American edition, translated from the seventh German edition of the work, is, except for additional editorial comment, generally a reprint of the previous one. In the author's preface we read, " our profession . . . . is like a faith whose God may be judged from the character of him who worships. Thus to many comes the impulse to devote themselves with fervour to something purer, higher, and less tangible; to ponder how the wondrous processes of life unfold themselves in the sick; to understand how disease arises out of health; to be a nature philosopher. The tendency to speculate is deeply rooted in us of German blood: to seize with winged thought what only calm painstaking study can elaborate and acquire. We like to construct in thought edifices which can only be erected upon the foundation stones furnished by the more suitable and exact methods of the laboratory." No date is appended to indicate the year of issue of this seventh German edition. The book is fully indexed, a special index of diagnostic symptoms and signs is added, and a copious bibliography is appended to each section.

A GERMAN-ENGLISH DICTIONARY FOR CHEMISTS. By AUSTIN M. PATTERSON, Ph.D. Pp. xvi + 316. Price 9s. 6d. net. London: Chapman and Hall, Ltd., 1917.

The author assigns as his reason for the compilation of this work that "to the advanced worker in chemistry a knowledge of German is almost indispensable, since a very large proportion of chemical literature is published in that language." That statement may be true of the past, but whether it will be true of the future may reasonably be held to be doubtful. At present German and all that is German is in the melting pot, and the world is engaged in contemplating the dross, dense and foul, which is accumulating as the result of the process. Scientific workers, and the governments of nations, have come to realize their neglect in permitting Germany to gain a pre-eminence in chemical, industrial, and other sources of national prosperity. The effect of this awakening will be to establish a new order of things—already in this country much has been accomplished in this regard—and after the War it will be found that the legend "made in Germany" will cease to be a distinguishable feature of the world's produce. Meanwhile, this dictionary for chemists will possibly supply a want in connexion with the pre-war German chemical literature. The German words are printed in the same type as their English expressions—namely, Roman, thus adding emphasis to the eccentricities of the German language, upon which Mark Twain commented so humorously. For example, "stuckgips" is the best that the language can do to express plaster of Paris, and the same is true of "stückgut" for gun-metal, to take two instances.

GLAUCOMA: A TEXT-BOOK FOR THE STUDENT OF OPHTHALMOLOGY. By ROBERT HENRY ELLIOT, M.D., B.S.Lond., Sc.D.Edin., F.R.C.S.Eng., Lieutenant-Colonel I.M.S. (retired). With 158 illustrations, including one coloured plate; pp. xvi + 546. Price 21s. net. London: H. K. Lewis and Co., Ltd., 1918.

The author is adding to his literature upon the subject of glaucoma. Of his four volumes under this title the last was compiled for general practitioners. the present one is intended for the student of ophthalmology. In its pages are comprised ten chapters, an appendix, an index of subjects, and an index of names. The subject is exhaustively dealt with, detailing many original observations based upon the author's investigations and experience, and discussing and describing the work of British authorities, and that of Continental observers. Every department dealing with this theme has been laid under contribution in order to achieve his object—completeness of record. Much space, naturally, is devoted to the operative treatment of the disease; the author's latest technique of the trephining method is fully described, and contrasted with that adopted by others. The work, taken as a whole, reflects very creditably upon the British school of ophthalmology; at the same time the author speaks glowingly of the work of Lagrange as the pioneer of the filtering scar. "All the modern filtration operations," he says, "from which we hope so much, are the indirect offspring of his genius. It is, therefore, fit and right that a summary of the history of glaucoma, which opened with the name of 'The Father of Medicine,' should close on that of the great Frenchman, Lagrange." The author introduces a new spelling of the usual word "miotic," assigning to it the more correct Greek interpretation "meiotic."

Proceedings of the Royal Society of Medicine.

SUPPLEMENT

(Vol. XI, No. 6, April, 1918).

NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.*—Ed.]

Syphilis. By Loyd Thompson, Ph.B., M.D. Illustrated with 77 engravings and 7 plates; pp. xviii + 415. Price $4.25. Philadelphia and New York: Lea and Febiger, 1916.

This book can be divided into two parts: (1) clinical, (2) pathological. The clinical part touches every organ in the body, and each organ is dealt with under the headings of clinical history, diagnosis, prognosis and treatment. This sub-division has led to much recapitulation. Undue emphasis is placed upon rare clinical conditions and not enough upon the most important of all lesions—namely, the primary sore. The clinical part has also been made subordinate to the pathological part. If the examination of the *Spirochæta pallida*, the Wassermann reaction, and all the other laboratory tests are going to stand the test of time, and to replace clinical knowledge or acumen, then the book will have served its purpose. Looking around we can see that the relationship between syphilis and the laboratory is fast becoming looser and that the clinical diagnosis of the disease is to regain its old importance. The photographs are good, and there are 76 coloured plates, two depicting clinical conditions and four pathological tests. The two clinical plates are syphilitic retinitis, an extremely rare condition, and interstitial keratitis, one of the easiest syphilitic lesions to diagnose. Of the four pathological plates, two are given up to the luctin reaction, a test of very doubtful value, one to the Wassermann reaction, and one to Lange's gold sol. test. It is a pity that there are no coloured plates of chancres or rashes, as these would have been of so much value to the student. Much space is also given to the author's various complicated, although ingenious, instruments for giving intravenous injections, &c.

White and Martin's Genito-Urinary Surgery and Venereal Diseases. By Edward Martin, A.M., M.D., F.A.C.S., Benjamin A. Thomas, A.M., M.D., F.A.C.S., and Stirling W. Moorhead, M.D., F.A.C.S. Tenth edition. With 422 engravings and 21 coloured plates; pp. xxiv + 929. Price 30s. net. Philadelphia and London: J. B. Lippincott Co., 1917.

As genito-urinary surgery and venereal diseases are two of the largest subjects in the domain of medicine, naturally only an outline is given of the various conditions. This increases the value of the work for those who are learning these branches, but diminishes it for those who are already specialists and who desire a fuller description, criticism of the opinions of others, &c., of any one subject. Apparently the authors have attempted to make the book as up-to-date as possible, for we note that the use of vaccines and serums, the tests of renal function and the syphilitic tests are more or less fully dealt with. The authors do not find that the treatment of syphilis can be regulated by the Wassermann reaction, nor do they believe in the invariability of continuing treatment until the reaction becomes negative. Not a very high opinion is held of the intrathecal injections in nervous syphilis. There are 422 engravings which enrich the work, but several of those which depict clinical conditions could with advantage have been more clearly or sharply reproduced. There are 21 coloured plates, which are only moderate in character, and not well selected from the point of view of utility.

TROUBLES MENTAUX DE GUERRE. Par JEAN LÉPINE, Professeur de Clinique des Maladies nerveuses et mentales à l'Université de Lyon. (Collection Horizon.) Pp. 203. Price fr. 4.40. Paris: Masson et Cie, 1917.

This volume is mainly intended as a guide for medical officers who have not had special experience in neuro-psychiatry. The material is taken from observation of 6,000 cases. It is stated that the circumstances involved in causation are so complex that no ætiological classification is possible. The author regards alcohol as the primary cause of the mental troubles of war in one-third of the cases and more than half influenced in some way by the same factor. The first chapter is devoted to acute mental disorders which are grouped into confusional, depressive, neurasthenic and concussional states with the various possible sequelæ of the last named. In Chapter II chronic psychotic conditions are considered—viz., chronic mental confusion from various causes and that due to dementia præcox, mental deficiency, chronic persecutory states, general paralysis and organic dementias. Certain other conditions are discussed later, including traumatic cerebral lesions, organic nervous diseases complicated by mental symptoms, while a few pages are devoted to epileptic states among which special attention is drawn to a form the author considers too often forgotten—i.e., the epilepsy of Brown-Sequard. Hysteria is dealt with briefly, and disagreement with German and Russian views on this subject is noted. Hypochondriasis, anxiety neurosis and special phobias are shortly referred to under the heading of psychasthenia. The second and shortest part of the book deals with questions of medico-legal interest. Simulation of mental disease is discussed and stated to be very rare. The means which should be employed to detect malingering and the conditions it may be mistaken for are pointed out. Interesting abnormal character types are delineated and in conclusion there is a chapter on organization and suggestions for added facilities in care and treatment. A classified and indexed bibliography is appended.

LABORATORY STUDIES IN TROPICAL MEDICINE. By C. W. DANIELS, M.B.Camb., F.R.C.P. Lond., and H. B. NEWHAM, M.D.Durh., M.R.C.P.Lond., M.R.C.S.Eng., D.P.H. Camb., D.T.M. & H.Camb. Fourth edition. With 6 coloured plates and 164 illustrations in the text; pp. xv + 560. Price 21s. net. London: John Bale, Sons and Danielsson, Ltd., 1918.

This well-known volume is essentially a *practical* guide to laboratory technique in the study of tropical diseases, and it is designed with the particular object of enabling the practitioner, both at home and abroad, to carry out the necessary examinations for himself without further help. The arrangement and scope are the same as in former editions, but the whole subject has been revised and brought up to date, amply illustrated, and provided with a comprehensive index. The authors first describe the construction and equipment of a small laboratory suitable for work in the Tropics, since in most regions a properly furnished laboratory is not available. Considerable space is devoted to the practical details of blood examinations, probably the most important and most productive measure which the tropical laboratory enables one to undertake. The best methods for the identification of the different species of parasites found in the blood and tissues in malaria, diseases due to trypanosomes, spirochætes, Leishmania, &c., and other common tropical diseases, are fully dealt with. The numerous genera and species of organisms belonging to the insects and arachnoids, such as mosquitoes, fleas, lice, bugs, and ticks, which so commonly convey tropical diseases to man and the higher animals are described, and their classification and life-histories, so far as these are of practical value, are also considered. Instructions are given for carrying out the chemical and microscopic examination of urine, particularly in malaria, filariasis and bilharziosis, and of the stools in protozoal diseases and worm infections. The bacteriology of tropical diseases, water-analyses, a simple modification of the Wassermann test, enumerative methods, and statistics complete a valuable asset to the standard literature of Tropical Medicine.

A COURSE IN FOOD ANALYSIS. By ANDREW L. WINTON, Ph.D. With 107 illustrations; pp. ix + 252. Price 7s. net. New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1917.

The analysis and composition of foods are much more subjects of study for the general student in America than in this country. Most of the text-books dealing with food analysis are consequently of American origin, and of these Winton's is the most recent. It does not profess to be an exhaustive treatise, and is intended only to start the student on the right road to an intelligent use of more extensive works. It is divided into ten chapters covering practical work to be carried out in forty laboratory periods of two hours each. Nine of the chapters are devoted to a description of the more commonly employed methods for the chemical analysis of dairy products, meat and fish, vegetable foods, saccharine products, fats and oils, fruits and fruit products, flavouring extracts, coffee, tea and cocoa, while the tenth is concerned with a description of the microscopical examination of vegetable foods and the means by which various starches are differentiated. The necessary tables for working out figures obtained in the analyses are given in an appendix. Although the methods of analysis described are only those suited for class work the principles of others are briefly considered, so that a clear conception of the whole subject may be obtained.

FINCH AND BAINES: A SEVENTEENTH CENTURY FRIENDSHIP. By ARCHIBALD MALLOCH, B.A.Queen's, M.D.McGill, Temp. Captain Canadian Army Medical Corps. With 9 plates; pp. x + 89. Price 10s. 6d. net. Cambridge: The University Press, 1917.

Taking advantage of his position as Medical Officer in charge of a small hospital for officers at Burley-on-the-Hill, in Rutland, the author has rendered valuable service to the history of medicine by unearthing the records of the lives of two medical worthies of the seventeenth century, Sir John Finch and Sir Thomas Baines. The two young men met as students of Christ's College, Cambridge, and their close and uninterrupted friendship lasted for thirty-six years. Both men were bachelors, and, as the custom of the period was, studied medicine in Italy. They obtained the M.D. degree of the University of Padua in 1657, were elected "Fellows Extraordinary" of the Royal College of Physicians of London in 1660, and received the M.D. degree of Cambridge University *in absentia* in 1661. Finch was connected with the family of William Harvey through his mother, whilst his sister Anne was actually a patient of that physician. It seems more than probable that Finch went to Padua upon Harvey's advice. Baines' eulogy of his master, Molinetti, the Professor of Anatomy at Padua, in the form of a Latin poem, is given *in extenso*. What greater tribute could there be to any teacher of anatomy than the line, "Non dissecas Molinette sed adornas corpora"? Finch had the more illustrious career of the two, for he held the posts of Pro-Rector and Syndic of the University of Padua in 1656, and Professor of Anatomy at Pisa in 1659, becoming the colleague of Malpighi and Borelli. Upon the friends' return to England he was appointed Physician to the Queen, and received the honour of knighthood. Baines, strangely enough, had been appointed Gresham Professor of Music, obtaining leave to depute his work when he accompanied Finch on his Continental tours. They went abroad again in 1662, Finch becoming soon afterwards King Charles's Resident at Florence at the Court of the Grand Duke of Tuscany. Baines, who suffered from vesical calculus, died in Turkey in 1681, his friend only surviving him twelve months. They are both buried in the Chapel of Christ's College, Cambridge. Numerous interesting sidelights are thrown upon contemporary history, and there are some good plates.

LES BLESSURES DU CERVEAU: FORMES CLINIQUES. Par CH. CHATELIN. Préface du Professeur PIERRE MARIE. 2me Edition. (Collection Horizon.) With 39 illustrations; pp. 200. Price fr. 4.40. Paris: Masson et Cie, 1918.

This work is founded on the study of more than 5,000 cases which were examined by Pierre Marie and the writer during the years 1915 and 1916. The first chapter contains a detailed description of the proper way to examine a patient, and the subsequent chapters describe the various syndromes following wounds of the brain according to their localization. Each chapter is preceded by introductory remarks on the anatomy and physiology of the region involved. In the last four chapters the writer discusses the complications of wounds of the brain such as meningitis, abscess and epilepsy, and foreign bodies in the brain. The surgical aspect of these wounds is to be dealt with by De Martel in a forthcoming volume in this series.

DISEASES OF THE SKIN: THEIR PATHOLOGY AND TREATMENT. By MILTON B. HARTZELL, A.M., M.D., LL.D. With 51 coloured plates and 242 illustrations in the text; pp. xiv + 753. Price 30s. net. Philadelphia and London: J. B. Lippincott Co., 1917.

This treatise is largely based, as stated in the preface, upon the author's own experience as a worker and teacher in this special department of medicine for more than twenty-five years. Reference is made to the fact that a not inconsiderable experience in general medicine has especially enabled the author to survey the subject from the point of view of the general practitioner, an advantage which all dermatologists will endorse and upon which too much emphasis cannot be laid when the special study of dermatology is contemplated for future practice. Considerable space has been allotted to the subjects of ætiology and pathology as being essential to the proper understanding of all rational treatment and prophylaxis. The author includes many recent remedies and methods of treatment now generally approved and especially details his own views based upon personal experience, repeating the essential maxim that success or failure depends quite as much upon the manner of their employment as their selection. The coloured plates and cuts in the text, including photomicrographs, are numerous and well chosen, and clearly portray the characters they are intended to represent, the importance of which, from an educational standpoint, cannot be over-rated. The magnifications of the various pathological sections are however omitted. A special feature is the inclusion of coloured plates of the exanthemata or eruptive fevers, which are of much clinical value. The section on syphilis is concise and up-to-date, but no illustration of the all important *Spirochæta pallida* or *Treponema pallidum* is given. The list of drugs producing dermatoses, as is pointed out, is incomplete. The names of authors of all nationalities are frequently referred to and their views quoted, but bibliographic references, which are the usual accompaniments of all recent scientific and medical works, and of essential service to the clinical investigator, are noticeably wanting. The whole volume constitutes a welcome addition to the literature of dermatology, and the author and publisher are both to be congratulated upon the successful completion of their work.

A MANUAL OF PRACTICAL X-RAY WORK. By DAVID ARTHUR, M.D., D.P.H., and JOHN MUIR, B.Sc., M.B., Ch.B., and B.Sc. (Pub. Health). Second Edition. With 185 illustrations; pp. xiv + 351. Price 12s. 6d. net. London: William Heinemann, 1917.

The second edition of this work, an introduction to X ray work for the beginner, and a reference for inexperienced workers, has been thoroughly revised and brought up to date. After an introductory note on the evolution of the X-ray tube and the properties of X-rays, the authors proceed to discuss the various types of X-ray tubes, sources of supply, intermediate apparatus, accessory apparatus, and the points requiring attention in the actual production of a radiogram. Chapters are then devoted to the interpretation of ordinary and stereoscopic radiograms, the localization of foreign bodies, diagnosis, and orthodiagraphy. The last chapter is devoted to X-ray therapeutics. The book is well illustrated, and there is a full index.

HUMAN INTESTINAL PROTOZOA IN THE NEAR EAST: AN INQUIRY INTO SOME PROBLEMS AFFECTING THE SPREAD AND INCIDENCE OF INTESTINAL PROTOZOAL INFECTIONS OF BRITISH TROOPS AND NATIVES IN THE NEAR EAST, WITH SPECIAL REFERENCE TO THE CARRIER QUESTION, DIAGNOSIS AND TREATMENT OF AMŒBIC DYSENTERY, AND AN ACCOUNT OF THREE NEW HUMAN INTESTINAL PROTOZOA. [Conducted under the Auspices of the Medical Advisory Committee, M.E.F. (January to August, 1916).] By Temporary Lieutenant-Colonel C. M. WENYON, B.Sc., M.B., B.S., R.A.M.C., and Temporary Captain F. W. O'CONNOR, M.R.C.S., L.R.C.P., R.A.M.C. With 4 plates; pp. 218. Price 10s. 6d. net. Published for the Wellcome Bureau of Scientific Research. London: John Bale, Sons and Danielsson, Ltd., 1917.

The authors discuss the practical aspects of the "carrier problem" in amœbic dysentery, and give their views on such important questions as the isolation of carriers and whether they are a danger to the community. The microscopical characters and differential diagnosis of the various amœbæ and flagellate protozoa, including three new species, which are found in the human intestine, are described in detail, and the methods and results of treatment of each of these infections is given. In the case of carriers of *Entamœba histolytica*, statistical evidence is given that the combined oral administration and subcutaneous injection of emetin is more efficacious as a cure than either of these alone. The use of other drugs, such as bismuth salicylate, turpentine, and β-naphthol for flagellate infections is discussed. A description is given of the experimental evidence which supports the authors' hypothesis that flies are important agents in the spread of amœbic dysentery, and the suggestion is made that systematic destruction of flies or prevention of their access to latrines would materially diminish the incidence of this disease. An appendix to the volume consists of tables giving the history of cases treated for protozoal infections.

ANAPHYLAXIE ET ANTIANAPHYLAXIE: BASES EXPÉRIMENTALES. Par A. BESREDKA, Professeur a l'Institut Pasteur. Préface de E. ROUX, Directeur de l'Institut Pasteur. Pp. vi + 147. Price fr. 4.40. Paris: Masson et Cie, 1917.

In the preface M. Roux gives a clear summary of the contents of this work and brings out the important conclusions. After an account of the general features of anaphylaxis and of the history of our knowledge of the subject since 1902, when C. Richet's observations appeared, and touching on his own work in 1907, the author goes into more detail as regards the preparatory or sensitizing injection and the toxic or explosive injection. All are agreed that as a result of the sensitizing injection of foreign protein, antibodies are produced, as this is proved by the transmission of anaphylaxis when blood is transfused from a sensitized into a normal animal, but divergence of opinion begins with the explanation of anaphylactic shock when the second injection of foreign protein is given. Richet believed that the antigen unites with the antibodies to form a poison—apotoxin. Besredka's view is that the antibodies form in the cells and that the antigen unites with them and that this process causes such a disturbance that anaphylactic shock results, although the body resulting from this union is atoxic. If the animal is anæsthetized no such shock results. Further, in order to avoid the fallacy, namely embolism and intravascular clotting, which Besredka says underlies Friedberger's theory of anaphylotoxins, the second injection of foreign protein should be made under the dura mater and not into the veins. If fractional doses of the foreign protein are given as the second injection and repeated, the union of antigen with antibodies in the cells occurs quietly and there is no anaphylactic shock. Desensitization or anti-anaphylaxis can thus be rapidly brought about, and a clear description of how this should be carried out in man is given. In a case of relapsing cerebro-spinal fever in which sensitization has taken place, 2 c.c. of serum is injected into the subdural space and after waiting two hours it is safe to inject 20 to 30 c.c. intrathecally. In urgent cases the same immunity can be more rapidly obtained by intravenous injection of $\frac{1}{10}$, $\frac{3}{10}$, 1, and 5 c.c. at intervals of a few minutes and if no symptoms arise, the curative intrathecal injection can be given after a further interval of ten minutes. The various theories of anaphylaxis are mentioned and criticized.

LECITHIN AND ALLIED SUBSTANCES: THE LIPINS. By HUGH MACLEAN, M.D., D.Sc. (Monographs on Biochemistry.) Pp. vii + 206. Price 7s. 6d. net. London: Longmans, Green and Co., 1918.

The word lipoids has been employed in such various senses, embracing substances so different, as cholesterol and pigments, that any attempt to restrict its use to the legitimate group of fat-like bodies—the phosphatides and cerebrosides—would result in chaos. Accordingly Dr. Maclean utilizes the word "lipins" for lecithin and the allied substances which are defined as of a fat-like nature yielding on hydrolysis fatty acids or derivatives of fatty acids, and containing in their molecule either nitrogen, or nitrogen and phosphorus. Of the phosphatides the best known are lecithin and kephalin, while the cerebrosides, which do not contain phosphorus, on hydrolysis yield the reducing sugar, galactose. A simple classification of the lipins is given by the author and is followed by others going so far back as Thudichum (1884), to whose brilliant but neglected work a generous tribute is paid. The chemistry, methods of extraction, isolation and purification of the phosphatides occupy two chapters, and then the cerebrosides are considered. Comparatively few chemists have interested themselves in Liebreich's protagon, and to many the name may have appeared unintelligible, to some indeed, according to Thudichum, "it was so much so that they believed it to be that of an animal." But among the "protagonists," as the author calls them, there has been a bitter discussion, and it appears that the correct view is that it is a mixture of cerebrosides and sphingomyelin with traces of other bodies. After a chapter on the alleged but disproved or doubtful lipins, there is an account of the comparatively uninvestigated plant lipins, and lastly there is a chapter, written under the limitations of service in France, on the function of lipins. Although it is generally assumed that lecithin can act as an antigen in the Wassermann reaction, experiments by the author and Dudgeon show that this is not so, and that the active substance is some other body difficult to separate from lecithin. That lipins are indispensable to life is obvious from their invariable presence wherever vital phenomena are manifest, but the particular part they play is at present quite unknown, despite their voluminous literature, which is well summarized in this monograph.

THE DIAGNOSIS AND TREATMENT OF VENEREAL DISEASES IN GENERAL PRACTICE. By L. W. HARRISON, D.S.O., Lieutenant-Colonel R.A M.C. With 16 plates and 84 illustrations in the text; pp. xvii + 482. Price 21s. net. London: Henry Frowde and Hodder and Stoughton, 1918.

The object of this work is to enable every medical man to gain a thorough knowledge of the technique of early diagnosis and treatment of venereal diseases. The writer first describes how a systematic examination of the patient should be conducted, and then discusses the general characteristics of gonococcal, syphilitic and other venereal infections. The following chapters are taken up by a topographical description of the lesions of venereal diseases, three chapters being devoted to the important subject of syphilis of the nervous system. The peculiarities of the venereal diseases of women, and the gonococcal and syphilitic affections of infants and children next receive attention. The two following chapters deal with the taking of specimens for laboratory examination, such as the blood serum and cerebro-spinal fluid for the Wassermann reaction, the examination of specimens by dark-ground illumination and other microscopical methods, and the interpretation of laboratory reports, an attempt being made to bring the pathologist and clinician into closer harmony. The treatment of gonorrhœa is then considered, general measures, including vaccines, being first discussed, local measures, such as irrigation and the passage of instruments, subsequently being described. A special chapter is devoted to the treatment of simple balanitis, papillomata and soft chancre. Lastly, the treatment of syphilis is dealt with in detail, considerable space being given to the study of the arsenical compounds Appendices contain a list of instruments and appliances commonly used in the diagnosis and treatment of venereal diseases, a description of the stains used for the demonstration of the gonococcus and *Spirochæta pallida*, and formulæ for use in gonorrhœa and for the mercurial treatment of syphilis by mouth.

Proceedings of the Royal Society of Medicine.

SUPPLEMENT

(Vol. XI, No. 7, May, 1918).

NOTES ON BOOKS.

The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.—Ed.]

Massage, its Principles and Practice. By James B. Mennell, M.A., M.D., B.C. (Cantab). With an Introduction by Sir Robert Jones, C.B., F.R.C.S. With 135 illustrations; pp. xvi + 359. Price 8s. 6d. net. London: J. and A. Churchill, 1917.

This book is written with two main objects in view. The first is to point out to the practising masseurs and masseuses what the writer considers to be the rationale of massage treatment with special reference to the necessity of observing care and gentleness in their technique. The second object is to place in the hands of medical men a book to which they can refer when issuing instructions to their masseurs. A book written with these two objects in view can certainly be said to have justified its existence. Too often do masseurs, in their appearance and methods, resemble, not too remotely, the exponents of the ring; while again his ignorance of the subject too often leads the medical man, in the treatment of a case, simply to prescribe "massage," leaving the details of the procedure to the masseur. What medical practitioner wishing to prescribe a potent drug would leave the question of dosage to a more or less trained assistant? A parallel condition of affairs too often obtains when prescribing "massage" for any case without specific instructions. As Sir Robert Jones states, in an introduction to this book, "there is no half-way house between success and failure: massage either does good or it does harm." In the first chapter of his book Dr. Mennell relates the circumstances which led him to become a disciple of the gospel of care and gentleness in the technique of massage treatment, which gospel he teaches all through his book. Chapters are devoted to the general principles of massage treatment, the movements of massage, mobilization as a sequel to massage, the use of apparatus for exercise, general rules for medical gymnasts, the treatment of recent injury, the treatment of the after-effects of injury, the re-education of muscle, and re-education in walking. Chapters then follow on massage treatment in neurasthenia and other functional diseases, diseases of the central nervous system, neuralgia, neuritis, constitutional disorders and disorders of the digestive, circulatory and respiratory systems. The last chapters are devoted to the treatment of deformities, and to massage as a remedy in the treatment of the wounded. In an appendix the apparatus devised for the treatment of exercises, as used in the Military Orthopædic Hospital, Shepherd's Bush, is described, along with drawings to scale. The text is well illustrated. There is a full index.

MILITARY MEDICAL MANUALS. General Editor: Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.P. WOUNDS OF THE ABDOMEN. By J. ABADIE, with a Preface by J. L. FAURE. Edited, with a Preface by Sir W. ARBUTHNOT LANE, Bt., C.B., M.S. With illustrations; pp. xxvii + 289. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

This work is divided into three parts, the first being entitled "What Treatment is to be preferred in Perforating Wounds of the Abdomen?" In the opening chapters the writer successively discusses the treatment of abdominal wounds in peace time, in previous wars, and in the course of the present war, which on strategic grounds he divides into three periods. In the first period, which was a war of movement, abstention from operation was the rule; in the second, which was one of trench warfare, laparotomy was generally advocated; while in the third period, in which there was a resumption of mobile warfare, a reaction set in in favour of abstention. In the fourth chapter, which deals with the various anatomical lesions, the influence of the nature of the projectile on the form and gravity of the lesion is first studied, and the significance of the wounds of the various abdominal viscera is then considered. In the following chapter the writer gives his reasons for regarding laparotomy as the best treatment for penetrating abdominal wounds. In the second part the necessary equipment for surgical operations near the front is described. The third part deals with the methods to be adopted in the presence of a deep-seated abdominal wound. The diagnosis of the particular lesion and the indications for operation are first considered, and the technique of the various abdominal operations is then described in detail. The last chapter is devoted to medical treatment, exceptional operations such as Murphy's suprapubic drainage, multiple drainage, ileostomy and colostomy, and operations for the sequelæ of penetrating wounds of the abdomen. A bibliography of the recent literature up to June, 1916, is appended.

ORGANIC COMPOUNDS OF ARSENIC AND ANTIMONY. By GILBERT T. MORGAN, D.Sc., F.R.S., F.I.C., M.R.I.A., A.R.C.Sc. Pp. xx + 376. Price 16s. net. London: Longmans, Green and Co., 1918.

The organic compounds of the two metalloids, arsenic and antimony, are not only of scientific interest but of the greatest practical importance in medicine, especially at the present juncture when salvarsan and its allied compounds are being necessarily manufactured in English-speaking countries. In the historical account it appears that the first production of organic arsenic compounds—and with a possible exception all organic arsenic compounds are synthetic—arose out of an attempt to investigate a sympathetic ink used in secret dispatches and obtained from treating smaltite, which contains cobalt and arsenic. It was thus that Bunsen later isolated the compound radical which Berzelius called cacodyl, and Sir E. Frankland, in 1849, showed to be a compound of arsenic and the radical methyl. After chapters on the aliphatic arsenicals and antimonials, and on the aromatic arsenicals, atoxyl is considered. Its true constitution was shown in 1907 by Ehrlich and Bertheim, and as the former found that the tervalent organic arsenical compounds were much more potent trypanocides and spirochætocides than the compounds of quinquivalent arsenic, such as atoxyl, this compound was used for the synthetic manufacture of tervalent compounds, and thus salvarsan was obtained. The chemistry of salvarsan and its derivatives is fully described and the synthetic processes detailed. Danysz's 102, or luargol, a combination of salvarsan with silver and antimony, is discussed, and then the aromatic antimonials, and lastly the miscellaneous organic derivatives of arsenic and antimony are considered. A bibliography of the most important researches and treatises down to the end of 1917 is given, and there are copious references to the original sources.

MILITARY MEDICAL MANUALS. General Editor: Sir ALFRED KEOGH. G.C.B., M.D., F.R.C.P. THE PSYCHONEUROSES OF WAR. By Dr. G. ROUSSY and J. LHERMITTE. Translated by WILFRED B. CHRISTOPHERSON. Edited, with a Prefatory Note, by WILLIAM ALDREN TURNER, C.B., M.D. With illustrations; pp. xxxv + 191. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

The writers' aim has been to give a faithful picture of the psychoneuroses of war based on their experience in the casualty clearing stations and special hospitals. The introduction, in which the various forms of malingering are discussed, is followed by a study of the various motor sensory and visceral manifestations of the psychoneuroses. The following chapter, which deals with nervous attacks such as the fit of terror and the fit of motor agitation, forms a natural transition to the purely psychical disorders. The latter are divided into four groups: (1) Those due to inhibition or diminution of mental activity; (2) Those due to inordinate excitation of mental activity; (3) Those found in cerebral concussion—e.g., those found in patients with cranial wounds and after trephining; (4) The "Sinistroses" of war. A special chapter is devoted to the nervous disorders induced by the explosion of a projectile close at hand. The treatment advocated is termed by the writers "the psycho-electric and re-educative method." Failures are attributed to unfavourable surroundings, initial mistakes in diagnosis, too slow methods, and lack of interest or time on the part of the physician. A bibliography confined to works which have appeared since the outbreak of the war is appended.

THE FITTING OUT AND ADMINISTRATION OF A NAVAL HOSPITAL SHIP. By EDWARD SUTTON, Fleet Surgeon R.N. With illustrations; pp. viii + 110. Price 8s. net. Bristol: John Wright and Sons, Ltd., 1918.

This handbook is the result of practical experience gained in three hospital ships, of two of which the author was the senior medical officer during the first three and a quarter years of the European War. The first section contains the history and evolution of hospital ships, with some remarks on the direction that their development is undergoing or likely to undergo in the future, such as the extension of wards throughout the entire width of the vessel and the use of oil fuel; there is also an account of the Geneva Conference (1863-4), with the text from the Parliamentary Blue book of 1908. The second section deals with the conversion at the outset of the present war of S.S. *Drina* into a hospital ship under the author's supervision, and serves as a guide for future medical officers entrusted with a similar duty. The points to be taken into consideration when improvising ships for hospital purposes fall under the categories of the selection of a suitable vessel and the location of the special hospital departments, and are appropriately illustrated by the measures adopted in the case of the *Drina*. The third section, on the ordinary organization of a hospital ship, gives in detail the medical and other members of the staff and their duties, such as the routine of embarking and disembarking patients. This section contains illustrations of useful devices whereby information as to vacant cots and the state of the stores can be learnt at a glance, and also of man-handling patients and of cots and stretchers. The fourth section deals with the emergency organization entailed by the admission of a large party of wounded and shipwrecked men far in excess of the number of fixed cots, and shows how this emergency accommodation can be rapidly and smoothly effected. Here, again, illustrations of registration boards show how a carefully thought-out plan can be at once put into execution. The appendix contains reproductions of the printed forms in use in His Majesty's hospital ship *Drina*.

DYSENTERY, ASIATIC CHOLERA AND EXANTHEMATIC TYPHUS. By H. VINCENT and L. MURATET. With an Introduction by ANDREW BALFOUR, C.M.G., M.D. Edited by GEORGE C. LOW, M.A., M.D. Pp. viii + 227. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1917.

Each of the three divisions of which this work was composed is subdivided into three parts, the first being devoted to a clinical survey, and the second to the epidemiology and prophylaxis of the diseases indicated in the title. With the exception of the morbid anatomy, every aspect of the diseases is thus considered. A full account of the bacteriology of the dysenteries and cholera is given, as well as of the valuable researches into the etiology of typhus by Nicolle, Comte and Conseil in Tunis, and of Anderson and Goldberger, Ricketts and Wilder in Mexico. The carrier problem in relation to the dysenteries and cholera is fully discussed, and special stress is laid on the epidemiological importance of mild and abortive cases in these two diseases. Several pages are given to a description of the campaign against lice in the chapter on the prophylaxis of typhus. The volume contains an index, which was wanting in the French edition.

MEDICAL CONTRIBUTIONS TO THE STUDY OF EVOLUTION. By J. G. ADAMI, M.D., F.R.S., F.R.C.P., Temporary Colonel C.A.M.C. With 7 plates and 20 figures in the text; pp. xviii + 372. Price 18s. net. London: Duckworth and Co., 1918.

Part I of this volume consists of the Croonian Lectures on "Adaptation and Disease," delivered in June, 1917, and is a summary of the author's views which, as a student of pathology, he had adopted in the years preceding the War. After a statement of the basal problem of evolution—whether variation is primarily inherent or primarily acquired—the author, from a consideration of the evidence of adaptation as it affects the pathogenic bacteria, concludes that although there is fixity of bacterial species, yet they also possess adaptive qualities, and that fluctuations and mutations in them can be produced by alterations of environment, both chemical and physical, inexplicable on the hypothesis of "chance variation." In this way epidemic disease may arise *de novo* by the evolution of specialized pathogenic forms from widely-diffused saprophytes. Immunity, antitoxic and bacteriolytic, and phagocytosis represent the acquirement of new and positive qualities by the animal organism, emphasis being laid on what the author calls the "Law of Habit," by which he means the persistence of functional activity when it has once started. To the operation of this law are ascribed the production of antibodies, of certain states of disease such as mucous colitis, of the varied symptoms developed in "shell shock" and "fear neuroses," and the development of the metaplasias and neoplasias. Drugs, toxins and hormones, by a process of "parallel induction," so act upon not only the parental germ plasma, prior to conception, but also upon the tissues in general of the parent as to affect the offspring in the same direction as the parent, and the acquired metabolic disturbances in the latter are capable of being inherited by the former. The lectures end with a discussion on the physico-chemical basis of immunity and evolution, particular attention being devoted to the structure of the biophoric molecule, the properties of fluid crystals, an elaboration of the side-chain theory of enzyme action and an interpretation based thereon, of the mechanism of immunity and other phenomena. Part II, "On Variability and Adaptation," and Part III, "On Growth and Overgrowth," are a reprint of certain papers arranged to show the various steps by which the author progressed to the complete presentation of his views in the Lectures. Two Appendices are added, the first giving the results of some experiments by Major Bowman, C.A.M.C., on *Bacillus typhosus re* adaptation, the other being the reprinted correspondence between the author and Sir E. Ray Lankester, which arose out of disputed points in the Croonian Lectures. There is an adequate index.

APPLIED BACTERIOLOGY: STUDIES AND REVIEWS OF SOME PRESENT-DAY PROBLEMS, FOR THE LABORATORY WORKER, THE CLINICIAN, AND THE ADMINISTRATOR. Edited by C. H. BROWNING, M.D., D.P.H. Pp. xiii + 291. Price 7s. 6d. net. London: Henry Frowde, Hodder and Stoughton, 1918.

This book is a collection of papers from scientific journals by the author and his co-workers at Glasgow University and the Bland-Sutton Laboratory of the Middlesex Hospital. New, hitherto unpublished observations have been added to most of the chapters. The subjects dealt with are chiefly those which have attained to a prominent position of practical importance during the four years of war. The chapters on the "Enterica" group of bacteria (C. H. Browning, T. J. Mackie and L. H. D. Thornton) give the results of the recent investigations on the isolation of *Bacillus typhosus* and its allies from the blood, urine and fæces; whilst a section on serological tests deals with the value of the Widal in inoculated persons, the absorption of agglutinins in mixed infections, and Marris's atropine test. The portions of the book devoted to "Studies in Antiseptics" (C. H. Browning, W. Gilmour and R. Gulbransen) deal chiefly with the germicidal actions of those benzol derivatives which have been so largely used as antiseptics lately. The editor himself contributes two comprehensive chapters on (1) the chemistry of antibody reactions, with special reference to the physical chemistry aspect of the problem, and (2) the life history of the tetanus bacillus and the recent immunological investigations connected with this microorganism. Observations on the diphtheria group (J. F. Smith) with special reference to the recognition of pathogenic types, and the use of telluric acid as a method of isolation; the possibility of applying ultra-violet radiation (C. H. Browning and S. Russ) as a means of discriminating between organisms; and the use of calibrated pipettes in serological work (C. H. Browning) are all dealt with from the practical point of view of the laboratory worker. A list of recent references is given at the end of each chapter.

MILITARY MEDICAL MANUALS. General Editor: Director-General Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.P. THE ABNORMAL FORMS OF TETANUS; A CLINICAL, PATHOGENIC, PROPHYLACTIC, AND THERAPEUTIC SURVEY. By MM. COURTOIS-SUFFIT and R. GIROUX, with a Preface by Professor FERNAND WIDAL. Edited by Surgeon-General Sir DAVID BRUCE, C.B., F.R.S., LL.D., and FREDERICK GOLLA, M.B. Pp. 249. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

In spite of the limitations expressed by its title this book contains a complete summary of the knowledge that every medical man should possess on the ætiology, pathogenesis, prophylaxis and treatment of tetanus. The work is divided into two parts. In the first the writers describe the well recognized atypical forms of the disease—viz., splanchnic tetanus and the different varieties of cephalic tetanus. The second part deals with local tetanus of the limbs, which is more or less a clinical novelty, and contains the histories of sixteen illustrative cases. The last chapter is devoted to a full discussion of the prophylactic and curative treatment of the disease. A bibliographical index of the literature up to and including 1916 is appended.

THE ROMANCE OF THE HUMAN BODY. By RONALD CAMPBELL MACFIE, M.A., M.B., C.M., LL.D. Pp. vii + 275. Price 5s. net. London: Wells Gardner, Darton and Co., Ltd., 1917.

After describing, in language at once scientific and imaginative, the cellular theory of the make-up of the living organism and the chemical composition of the human body, the author goes on to treat in considerable detail of the functions of its principal organs and systems. Whether it be the brain, heart, or blood that is under consideration, the latest scientific facts are incorporated with vivid descriptions of the mechanism which "puts to scorn all machinery." The idea of a great Purpose at work in the making of a man is prominently upheld throughout the book, in the last two chapters of which the various doctrines of evolution are critically examined. Admitting the possibility of prescient mutations, the author is led to the conclusion that Darwinism was a scientific triumph and yet a spiritual disaster, "for it deprived life of a great part of its mystery, and substituted the hand of Chance for the hand of an omniscient Creator, and the world ought to rejoice that the progress of science has now left Darwinism behind it." The destruction of "millions of young men, each an organic miracle," in the Great War is regarded as an unfathomable mystery the tragedy of which can only be explicable on the grounds of the belief that death is not the destruction that it seems to be, but is, in reality, the portal to a fuller life. As a means of broadening the outlook of teacher and student alike, this is a book to be read in conjunction with any standard work on anatomy and physiology.

THE INFLUENCE OF SUNLIGHT IN THE PRODUCTION OF CANCER OF THE SKIN. By C. NORMAN PAUL, M.B., Ch.M. With 44 plates; pp. 57. Price 10s. 6d. net. London: H. K. Lewis and Co., Ltd., 1918.

This book deals with several different forms of pre-cancers and cancers of the skin, in which sunlight may act as a cause. The author gives the results of his experience in the radium department of the Sydney Hospital. The diseases dealt with are xeroderma pigmentosum, rodent ulcer, chronic solar dermatitis, cutaneous horn, multiple rodent ulcer, tropical skin, and epithelioma, all of which are believed, in greater or lesser degree, to originate in excessive sunlight. The symptoms and pathology of each of these conditions are gone into and comparisons are made between them. Most of these disorders are of common occurrence in Australia, and are "regarded as one of the penalties to be paid for inhabiting a country normally destined to be occupied by a coloured race." Their treatment with radium has been found so successful. that the more advanced manifestations of skin cancers are now seldom met with in Australia. The plates are an important feature of the book.

THE SPLEEN AND ANÆMIA: EXPERIMENTAL AND CLINICAL STUDIES. By RICHARD MILLS PEARCE, M.D., Sc.D., with the assistance of EDWARD BELL KRUMBHAAR, M.D., Ph.D., and CHARLES HARRISON FRAZIER, M.D., Sc.D. With 16 illustrations; pp. x + 419. Price 21s. net. Philadelphia and London: J. B. Lippincott Co., 1918.

The first part of this volume, more than half of the whole, is devoted to the results of experimental studies. From these it appears that splenectomy is followed by anæmia, a lessened degree of jaundice following administration of hæmolytic poisons and an increased resistance of the red cells to hæmolysis. The changes in the bone marrow, lymph nodes and liver after splenectomy also receive detailed consideration. Metabolism before and after splenectomy has been the subject of fewer experiments and the results are less definite. The second part of the book is devoted to clinical observations on various cases of splenomegaly which have come under the writers' notice and these are discussed from the view point gained in the experiments already detailed. Treatment both by splenectomy and medical methods and methods of diagnosis occupy three chapters. The third part of the book deals with the actual operation of splenectomy and the technique which the authors have found most suitable. The combination of transfusion of whole blood with splenectomy is also described. The authors frankly acknowledge that their experiments are not yet conclusive on several points but on others may almost be regarded as final.

THE STORY OF THE BACTERIA AND THEIR RELATIONS TO HEALTH AND DISEASE. By T. MITCHELL PRUDDEN, M.D. Third edition. With 13 plates and 15 figures in the text; pp. x + 232. Price $1.00. New York and London: G. P. Putnam's Sons, 1917.

This is a popularly-written account of the main facts of the science of bacteriology, in which the rôle played by micro-organisms in everyday life, as well as in disease, is plainly set forth. The perils of dust and flies are pointed out, and the hygienic rules by the observance of which comparative freedom from germ diseases may be secured are clearly indicated.

HYSTERICAL DISORDERS OF WARFARE. By LEWIS R. YEALLAND, M.D. With Preface by E. FARQUHAR BUZZARD, M.D., F.R.C.P., Lieutenant-Colonel, R.A.M.C. Pp. xii + 252. Price 7s. 6d. net. London: Macmillan and Co., Ltd., 1918.

Though the title of this book is "Hysterical Disorders of Warfare," only the various hysterical manifestations connected with the motor and sensory systems are dealt with. These are brought under the headings of hysterical disorders of speech, hearing and vision; hysterical monoplegia, paraplegia and hemiplegia; fits, involuntary movements and disorders of gait; and hysterical disorders associated with organic disease. A chapter on malingering, which the author in concurrence with practically all observers finds rare, concludes the work. Apart from the clinical pictures drawn, much space is devoted to the therapeutic converse between the author and his patients, illustrating in detail what Lieutenant-Colonel Buzzard (who writes a preface) terms "an intensive method of treatment." Dr. Yealland is evidently mainly a follower of Babinski's views on hysteria, but the question of pathology is not entered upon. The book vividly shows what success may be encountered when the particular types of hysterical disorders spoken of are treated by vigorous persuasion, for many, if not most of the cases quoted at length had been of long standing and had passed through many hospitals before admission to the National Hospital for Paralysis.

MARRIED LOVE: A NEW CONTRIBUTION TO THE SOLUTION OF SEX DIFFICULTIES. By MARIE CARMICHAEL STOPES, D.Sc., D.Ph. With a Preface by Dr. JESSIE MURRAY and Letters from Professor E. H. STARLING, F.R.S., and Father STANISLAUS ST. JOHN, S.J. Pp. xvii + 116. Price 5s. net. London: A. C. Fifield, 1918.

This book deals with a domain of great importance namely, sexual psychology from the side of the woman. Its very frankness is its best recommendation. Happy marriages are the best remedy for the great danger of illicit intercourse, leading straight to the spread of venereal disease, as well as to the deterioration of national home life. Chapter IV, on the "Fundamental Rhythm," is very important. If its conclusions are correct, the existence of such a "rhythm" should be recognized; but it is to be hoped that the authors will somewhere and somewhen give the actual material on which it is based. Another cognate subject, which is only lightly touched, is the sexual psychology of unmarried women, especially at the "flapper" period. Girls in this stage are at the present time a great national danger. It is undoubtedly the fact that the absence of sexual feeling in a large number of women acts disastrously and breaks up marriages which might otherwise be happy. The only essay on this subject known to us is Dr. Matthews Duncan's Gulstonian lectures on sterility; but it would be a great gain to know more accurately the facts on this question from the woman's side. What are really wanted are facts as to the condition of sexual feeling in girls between puberty and (say) 18; whether sexual desire is usually present; whether it is troublesome, recognizable, or merely dormant; whether it is specially unmanageable between those ages; what is its history in later years apart from marriage? In such an investigation care must be taken not to generalize from cases which are abnormal or have been unhealthily stimulated. There are some grounds for thinking that self-control is more difficult from (say) 16 to 18 than later, that special care is needed at this time, and that if this dangerous period is safely passed the peril is less. The book suggests that mutual understanding and consideration in marriage requires wise development, that some knowledge of the sexual psychology of the opposite sex is necessary on both sides; and that experience gained from loose women is worse than ignorance, because it gives a radically distorted view. There is, however, the danger that self-knowledge and definite instruction may lead to self-consciousness and introspection. One can imagine nothing more disillusioning than marriage with a girl who had taken honours in sexual psychology. In the majority of cases real love between two persons presided over by Nature, the mother of us all, leads the pair to the haven where they would be. The chapter on "Mutual Adjustment" (Chapter V) contains much sensible advice, based upon the generalizations of the preceding chapter. Undoubtedly mutual consideration is the keynote of happiness, and human beings have much to learn from the beautiful courtship of some of the lower animals, especially of birds. In this chapter, however, there are several mis-statements in matters of anatomy and physiology (as well as some in spelling). These could easily be corrected (see especially page 4). Page 50 contains some valuable practical advice, though the details (from the side of the male) seem impracticable. This chapter is closely bound up with the next, on "Sleep" (Chapter VI), and this again suggests reasons for unhappy marriage which, if recognized, might lead to considerable relief. In a subsequent chapter the subject of "Inviolate Pregnancy" (though not under this name) is considered, and at the top of page 84 is a hint given which we hope we have mistaken. Here again mutual respect and consideration is the best guide. On pages 85 and 86 some hint is given as to future possibilities of parthenogenesis, and authors are referred to, but in such a way as to make it impossible or difficult to look them up. This passage sounds very queer! And so do the last two paragraphs on page 87. The above criticism is offered in the hope that something more valuable may spring out of this little book. We do not feel on reading it that we are on firm ground, but it is very suggestive, and if its main generalizations can be established, much good may ensue. Mutual knowledge, mutual respect, and mutual consideration are well worth cultivating in married life even at the cost of great trouble. There are one or two works bearing upon the subject which are worth mentioning. The duties of dalliance were insisted on by Ambroise Paré; all young couples ought to read Gustave Droz's charming "Monsieur, Madame et Bébé"; Zola in his "Fécondité" lays great stress on what Dr. Stopes calls "Fundamental Rhythm," but seems to apply it as an established fact in both sexes. This book may be useful to the medical profession. There is a danger that it might prove the reverse to the general public.

Proceedings of the Royal Society of Medicine.

SUPPLEMENT

(Vol. XI, No. 8, June, 1918).

NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention to some of the new books and new editions which have been added to the Society's Library.*—Ed.]

Otosclerosis (Idiopathic Degenerative Deafness). By Albert A. Gray, M.D., F.R.S.E. With 20 plates; pp. xii + 199. Price 12s. 6d. net. London: H. K. Lewis and Co., Ltd., 1917.

The writer describes the disease as an "idiopathic progressive degeneration," this term indicating the peculiarity of its occurrence in certain people, and certain people only, even though the same exciting causes may be present in others who are, however, free from the special predisposition. There are, therefore, predisposing causes which vary in different subjects, but one of the most potent is heredity. This aspect of the case is very fully considered. Exciting causes, such as childbirth, anæmia, inflammation, injury and intestinal intoxication can be identified in many cases, but they only produce otosclerosis in predisposed persons. That the disease is not a genuine chronic inflammation is shown by the morbid microscopical anatomy which reveals a very striking and characteristic line of demarcation round the focus or foci of disease, and the absence of the fine-celled infiltration indicative of inflammatory changes. It is a retrograde process, and the attribute "degenerative" conveys this idea. One new fact with regard to it is the observation of an increase in the calcium and magnesium in the blood, this indicating a metabolic change of some kind, the explanation of which is not for the moment forthcoming. Various methods of treatment which have acquired unmerited notoriety among the medical and lay public are considered and condemned, as positive harm may result from their application. Though nothing can eliminate the peculiar predisposition which leads to the development of otosclerosis, something can certainly be effected by studying in each individual case the factors which have determined the awakening, the development and persistence of their obstinate condition, and by the employment of appropriate measures for combating them. The pathological studies which occupy a large portion of the book are based upon the descriptions of the microscopical anatomy of specimens cut and examined by the author himself. The specimens were derived from subjects whose clinical history was known to him to be what would be described as that of otosclerosis by all competent judges. The photographs illustrating the histology of the process were produced without any "touching up." The specialist will find them a valuable means of familiarizing himself with the pathogenesis of a disease which has always been something of a mystery. The practitioner will find useful guidance in his efforts to relieve this intractable disease.

AN X-RAY ATLAS OF THE SKULL. By A. A. RUSSELL GREEN, M.B., B.S.Lond., M.R.C.S.Eng., Captain R.A.M.C.(T.) With 5 coloured plates; pp. x + 27. Price 10s. 6d. net. London: Longmans, Green and Co., 1918.

Following a short description of the apparatus employed by the author, this volume contains a series of seven plates in which are figured skiagrams of the skull as radiographed from various angles. The first two plates are from the living subject, while the remainder depict the dried and prepared skull. A plane passing through the nasion and the centre of the external auditory meatus, and referred to as the naso-meatal plane, is taken as the basis of the scheme for indicating the different positions in which the hesd or skull was fixed when the skiagrams were taken. A glance at the smaller photographs on the earlier coloured plates will make the scheme intelligible, and will probably be found a useful preliminary to the study of plates 1 and 2. It is, however, necessary to note that the line round the skull is not that of the naso-meatal plane. Notes on the localization of foreign bodies in the head are given, and to these is added a Table showing the relations between the displacement of shadows and the distance of bodies throwing those shadows from the photographic plate or fluorescent screen. The book is primarily intended for surgeons. Medical aspects of abnormality of the skull—e.g., microcephaly and enlargement of the pituitary fossa—are not dealt with.

TRAITEMENT DU TABES (MÉNINGOMYÉLITE SYPHILITIQUE POSTÉRIEURE). Par E. LEREDDE. Pp. vii + 487. Price 15 fr. Paris: A. Maloine et Fils, 1918.

The first 150 pages consist of an exposition of Leredde's method of treating tabes. He considers that the syphilitic nature of tabes is, at the present time, proved to demonstration, and that the question of the treatment of tabes cannot be considered apart from that of long-standing syphilis with its localizations, visceral and nervous. Tabes may be looked upon as the type of rebellious affections of the nervous system, but may be so ameliorated by prolonged and intensive treatment as to be capable of clinical cure. Leredde has abandoned the use of mercury in the majority of cases, and employs only intravenous injections of arsenobenzol, or more frequently neo-arsenobenzol, over a prolonged period and in adequate dosage. The injections are given weekly in courses of three to a dozen injections, with intervals of three weeks between the courses, until thirty to fifty or more injections have been given. Small doses of neo-salvarsan are given at the beginning, 0·01 grm., or 0·15 grm., progressively rising until the normal dose of 0·9 grm. is reached or even passed, doses of 1·2 grm., and even 1·5 grm. being reached; care being taken to commence each subsequent course with a dose smaller than was reached during the preceding course. The phenomena consequent on the injections, and the incidents and accidents due to arsenobenzol are discussed at great length, stress being laid on the importance and recognition of the reaction of Herxheimer on the cause of these conditions. The results of treatment are next considered and set forth in detail. The second part of the volume, comprising nearly 250 pages, consists of the detailed histories of all the cases of tabes, eighty-seven in number, seen by Leredde between 1910 and 1916, arranged in groups according to the number of injections received, the best results having been obtained amongst the last group of cases, who had received the largest number of injections.

BURNS AND THEIR TREATMENT, INCLUDING DERMATITIS FROM HIGH EXPLOSIVES. By J. M. H. MACLEOD, M.A., M.D., F.R.C.P. With 19 illustrations; pp. xvi + 160. Price 6s. net. London: Henry Frowde, Hodder and Stoughton, 1918.

This is a timely book, with full description of the treatment of burns resulting from heat, electricity, lightning, X-rays and radium (where the author is much at home), and there is a specially interesting chapter on burns from corrosives and self-inflicted injuries. The second part is devoted to the consideration of dermatitis from high explosives, with a detailed *résumé* of the effects of tri-nitro-toluene and tetryl; one could wish this important section had been more expanded. There are several useful illustrations, and this book should prove of particular value to the harassed practitioner confronted as he is with unfamiliar conditions following in the wake of war.

NOTRE SYMPATHIQUE CONFRÈRE, FRANÇOIS RABELAIS. Conférence faite le 21 Février, 1918, à la Société Médicale de Genève. Par le Dr. CHARLES GREENE CUMSTON, Privat-docent à l'Université de Genève, Fellow of the Royal Society of Medicine, &c. With 10 plates ; pp. 24. Genève : Georg et Cie, 1918.

Professor Cumston's brochure deals with the medical life of François Rabelais. If born in 1483 he was 47 when on September 15, 1530, he became a medical student at the famous school of Montpellier. His signed declaration to observe the Statutes of the University on his Matriculation may still be seen in its Archives, with the laconic marginal note "Solvit tres libras." As candidate for the licence to practise medicine he had to give a three months' course of public lectures, and he chose for his subject the "Aphorisms" of Hippocrates, and the "Ars parva" of Galen. Possessor of a valuable Greek MS. he was able to amend the text falsified by previous commentators, and the numerous errors which had crept into editions in common use. These corrections he clearly explained in his dedicatory epistle to the Bishop of Maillezais which appears at the head of the Aphorisms published by him in July, 1532, at the house of Sebastien Gryphe. In the same year he published the first Latin translation of the "Ars parva" which had appeared, and being introduced to Jehan Canappe, then occupied in translating Galen's works relative to surgery, Rabelais was able to supply a modification of an apparatus designed by Hippocrates for the treatment of fractures, and called it by the barbarous name "glossocomion." He also invented a syringotome, or guarded bistoury, for incision of the peritoneum. The faculty of Montpellier had the privilege of obtaining the bodies of four criminals for dissection every year, and Rabelais at this period (1532) dissected in public the body of a man who had been hanged. This event was celebrated by his friend, Étienne Dolet, afterwards burnt for heresy, in a Latin poem. After some voyages to the isles of Hyères in order to collect medical plants for a herbal, Rabelais migrated to Lyon, where he became attached to the great hospital from the commencement of the year 1532, at a salary of 40 livres tournois per annum. He is the first "interne des Hôpitaux" whose name has come down to us. He did not retain his position long. Owing to his habit of absenting himself without leave from his hospital duties for weeks or months at a time, the author of "Pantagruel" was suspended from his office and one Du Castel was appointed in his stead. This was in 1535. Without protest, Rabelais returned to Montpellier, obtained his licence to practise in April, 1537, and in the following May graduated as Doctor of Medicine. In 1539 he acted as medical attendant to Cardinal de Langey, and in 1533 he had served Cardinal du Bellay in a similar capacity. 1546 saw him appointed physician to the hôpital Saint-Nicolas, Metz, at a salary of 159 livres per annum. A part of his duties as medical officer to the town of Metz was to clear the streets of prostitutes. The hospital patients were divided into "bons et pauvres," the former being plague stricken, and the latter leprous and syphilitic. His medical reputation rested chiefly on his treatment of venereal diseases. There are copious references to syphilis in his works, but only one to gonorrhœa, which he apparently regarded as a trivial disease when treated by "Gargantuan" doses of lenitive diuretics and drastic purgatives. He was, however, exasperated by physicians who occupied themselves in discussing the pathogeny of "cette pisse chaulde." "Mieulx eux vauldroit se aller frotter le cul au panicault (chardon a cent têtes) que de perdre ainsi le temps à dispute de ce dont il ne savent l'origine." He treated syphilis on the method of the Italian Gaspard de Torella, by mercurial inunction. Physicians of the fifteenth century formerly employed only very weak preparations, that of Torella was only 1/40, but emboldened by the results, they increased the dosage, and in the sixteenth century daubed the patients from head to foot with mercurial ointment. In addition they were sweated and fumigated in hot stoves for twenty-five days on end, and so reduced in strength by this and by mercurial stomatitis which Rabelais graphically describes, that some died in a few days, others supported a miserable existence, and scarcely 1 per cent. of the population escaped the doctors. His estimate of the prevalence of this disease may be judged by the remark of Epistemon, "Ceux qui n'ont eu la vérole en ce monde-cy, l'ont en l'autre." The account of the birth of Gargantua gives Rabelais an opportunity of displaying his knowledge of obstetrics, of the ignorance and malpraxis of midwives, and of anatomy. The midwife applied "un restrinctif si horrible" that the natural passages were closed, and

Gargantua made his way through the uterine sinuses into the inferior vena cava, thence through the diaphragm into the superior vena cava, and ultimately entered the world through his mother's left ear. Rabelais does not state how he manœuvred the heart in his progress. He maintains that his account of the nativity of Gargantua is not more marvellous than those related by Pliny in his Natural History—"et toutesfois je ne suis poinct menteur asseuré comme il a esté." Both "Gargantua" and "Pantagruel" teem with anatomical and pathological terms. In addition to the "Aphorisms," of which rare work a facsimile of the title page is given in the appendix of Professor Cumston's paper, another medical treatise is attributed to Rabelais. This is "Le quatrième livre de la Thérapeuthique, ou auquel est singulièrement traictée la cure des ulcères, translatée par Philiatros," MDXXXVII. There is no valid reason for ascribing "Le Triumphe de trés haulte et puissante Dame Verolle, Royne du Puy d'Amours" to the pen of Maitre François. The authenticity of "Les Songes Drôlatiques de Pantagruel," published twelve years after the death of Rabelais, is still *sub iudice*. This volume contains 120 figures without any text; five or six of the figures are here reproduced. Professor Cumston also supplies photographs of three portraits of Rabelais which he considers to be genuine—namely, one in l'École de Médecine de Montpellier, another in the Bibliothèque de Genève, and the third is the engraving by Michel Lasne.

THE PREVENTION OF VENEREAL DISEASES. By OTTO MAY, M.A., M.D.Cantab., M.R.C.P.Lond. Pp. xv + 240. Price 7s. 6d. net. London: Henry Frowde, Hodder and Stoughton, 1918.

This book gives a clear and concise account of the relationship of venereal disease to the community of to-day. Emphasis is laid on the facts that the normal sex-instinct is aroused and often made uncontrollable by artifice which is tolerated by the very authorities who claim to be occupied by a whole-hearted attempt to increase the general standard of morals of the country, and also that this toleration to a great extent nullifies the results of the latest achievements of medical science, which at last has a grip on these quite unnecessary and curable diseases. As regards prostitution, the author insists that the great campaign of prevention of disease would be helped considerably by clearing the streets. He points out that many men are tempted in this way who have no intention of misconduct. It is claimed, also, that whereas prostitution is largely the result of woman's economic oppression in the past, the future is bright with hope that the spread of disease may be checked. The distinction which is frequently drawn between "early treatment" and "prophylaxis" is shown to be based on the weakest of foundations; from the ethical point of view they must stand or fall together. The paramount importance of education and instruction is urged, and, not least, the better understanding of venereal diseases by the medical profession as a whole.

DISEASES OF THE HEART: THEIR DIAGNOSIS, PROGNOSIS, AND TREATMENT BY MODERN METHODS. With a Chapter on the Electrocardiograph. By FREDERICK W. PRICE, M.D., F.R.S.Edin. Illustrated; pp. xiv + 472. Price 21s. net. London: Henry Frowde, Hodder and Stoughton, 1918.

This is a text-book intended for the general practitioner, and is on modern lines, reflecting the work of Sir James Mackenzie, with whom the author has been much associated, containing 245 figures, showing sphygmograph, polygraph, and electrocardiograph tracings, but not dealing with the morbid anatomy of the various cardiac lesions. In the chapter on blood pressure Martin's modification of the Riva-Rocci sphygmomanometer is recommended as the best single instrument for ordinary practice, and the auscultatory method of arriving at the systolic and diastolic pressures is described. A special chapter at the end of the volume is devoted to clinical electrocardiography, and is freely illustrated by seventy-nine electrocardiograms chosen as the most representative of those taken from about 15,000 patients. The other recent developments in cardiology, such as auricular flutter, auricular fibrillation, the pulsus alternans and the action of digitalis, are duly passed in review.

BLESSURES DE LA MOELLE ET DE LA QUEUE DE CHEVAL ("Collection Horizon"). Par GUSTAVE ROUSSY et JEAN LHERMITTE. Préface du Professeur PIERRE MARIE. With 8 plates. Pp. viii + 202. Price 4 fr. 40. Paris: Masson et Cie, 1918.

This work consists of four parts. The first, which deals with wounds of the spinal cord, is subdivided into five chapters, in which the early and late stages of complete and partial section of the cord are considered, together with a full account of the pathological anatomy of direct lesions of the cord. A special chapter is devoted to the subject of spinal concussion, and is followed by one on the diagnosis of wounds of the cord. In the second part the lesions of the cauda equina and conus terminalis are discussed. The first three chapters of this part deal with the clinical aspects, the last chapter being concerned with the pathological anatomy of these lesions. The various complications of wounds of the spinal cord are described in the fourth part. Contrary to the generally accepted opinion the writers hold that meningomyelitis is very rare, whereas pleuro-pulmonary complications very frequently occur, and form one of the principal causes of the high mortality in wounds of the spinal cord. The fourth chapter contains a short account of the surgical measures used in the treatment of wounds of the spinal cord and cauda equina, and incorporates the conclusions adopted by the Inter-allied Surgical Conference relating to wounds of the spinal cord. A bibliography of recent literature is appended.

MEDICAL DISEASES OF THE WAR. By ARTHUR F. HURST, M.A., M.D.Oxon., F.R.C.P., Temporary Major, R.A.M.C. Second edition, revised and enlarged. With 6 plates; pp. vii + 319. Price 12s. 6d. net. London: Edward Arnold, 1918.

The present edition, which is more than double the size of the first, has been enlarged by the expansion of the single chapter on war neuroses in the original edition into eleven chapters. The additions include a criticism of Babinski and Froment's doctrine of reflex paralyses and contractures, a discussion of hyperadrenalism and hyperthyroidism in relation to war neuroses, the writer's views on psycho-analysis and an illustrated description of hysterical attitudes and gaits. A new chapter has been added on tetanus and the chapters on spirochætal jaundice, soldier's heart and war nephritis have been largely rewritten.

SIR WILLIAM RAMSAY, K.C.B., F.R.S.: MEMORIALS OF HIS LIFE AND WORK. By Sir WILLIAM A. TILDEN, F.R.S. With 6 plates. Pp. xvi + 311. Price 10s. net. London: Macmillan and Co., Ltd., 1918.

This sympathetic life of a great chemist, ranking with the master-builders of that science, such as Boyle, Black, Lavoisier, Priestley, Scheele, Cavendish, Davy, and Berzelius, is written by a friend of twenty-five years' standing, who, after a study of a long series of letters extending over fifty years, has given a true picture both of the man and the savant. With seven generations of dyers on the paternal side and many physicians on his maternal side, Ramsay, as he himself says in the outline of an autobiography in 1913, had "the prospect of possessing chemical instincts by way of heredity." He was an only son of parents both over forty at the time of his birth, and, like so many great men, owed much to his mother, whose transmitted qualities made him what he was. Originally destined for the Ministry, he was educated at Glasgow University, where he began chemistry, and when 18 went to Tübingen and took the Ph.D. with an inaugural dissertation on the toluic and nitrotoluic acids; here he began a life-long friendship with Professor Ira Remsen, then an assistant in Fittig's laboratory, and subsequently President of the Johns Hopkins University, when Sir W. Ramsay received an honorary degree there. Returning to Glasgow in 1872, he settled down to teaching and research work on the pyridine bases and quinine, and in 1879 he became Professor at Bristol. Here he became Principal of the College, and brought out a large quantity of original work before he was elected to the Chair of Chemistry at University College, London, in 1887, and F.R.S. the next year. The exciting story of the discovery of the new gases in the atmosphere—argon, helium, and others—is well told, and the investigations into radium, the therapeutic use of which was first suggested by Sir William Ramsay's friend from boyhood, Sir Lauder Brunton, follows. His views on education are fully given, and many readers will welcome his distrust of the examination system and his view that every teacher, from the Senior Professor to the youngest assistant, must be engaged in research. The volume contains four portaits of Sir William Ramsay, and contains an account of his travels and personal character as well as of his work.

THE NATION'S HEALTH: THE STAMPING OUT OF VENEREAL DISEASE. By Sir MALCOLM MORRIS, K.C.V.O. Pp. x + 150. Price 3s. 6d. net. London: Cassell and Co., Ltd., 1917.

This little volume by Sir Malcolm Morris, K.C.V.O., is a part of the campaign of the National Council for Combating Venereal Diseases. The book is divided into several chapters pointing out in clear language the relationship of these affections to the public health. Clear, succinct descriptions are given of the two chief diseases; and the various measures which are introduced for directing public attention to their importance receive adequate treatment. Notification, regulation and other proposals are dealt with in detail.

AN INTRODUCTION TO DERMATOLOGY. By NORMAN WALKER, M.D., F.R.C.P., with the assistance of R. CRANSTON LOW, M.B., F.R.C.P. With 152 illustrations; pp. xviii + 363. Price 15s. net. Edinburgh and London: William Green and Son, Ltd., 1916.

It is scarcely necessary to review at length so well known a text-book as Dr. Norman Walker's "Introduction to Dermatology" which has now reached its sixth edition. It may be stated that the author and Dr. Cranston Low have brought the work thoroughly up to date. The book is embellished with a fine series of coloured plates of the life-like models made by Dr. Low and Miss Rae.

INSTINCT IN MAN: A CONTRIBUTION TO THE PSYCHOLOGY OF EDUCATION. By JAMES DREVER, M.A., B.Sc., D.Phil. Pp. x + 281. Price 9s. net. Cambridge: The University Press, 1917.

The author refers to this book as an "essay" because it was originally submitted and approved as a thesis for the Doctorate of Philosophy of the University of Edinburgh, but such a title seems too modest for such a thorough discussion of his subject. The book opens with historical chapters on various definitions and views of Instinct from Lord Herbert of Cherbury in 1624 to the psychologists of the present day and this part occupies about one-third of the volume. The author throws over metaphysical psychology or philosophy as a *reductio ad absurdum*, "which set out from thought in isolation, returned to thought in isolation, but did not seem ever to reach experience in its life setting." The psychological nature of instinct and its relation to intelligence are fully discussed in the light of modern investigations and contributions, with special reference to the symposium on this subject in the *British Journal of Psychology* in 1910 and Professor Lloyd Morgan's book on "Instinct and Experience" in 1912. The author agrees with Myers in that (1) there is no instinctive behaviour without an intelligent factor, and (2) there is no intelligent behaviour without an instinctive factor; but he prefers to call the one essential psychological mechanism or function, not "instinct-intelligence," but "experience" which is not a mere psychological figment. There is a chapter in defence of the view that "meaning" in instinct-experience is affective and not cognitive on its first appearance; and the work closes with some interesting chapters on the relationship between Instinct and Emotion. There is a very full bibliography and the index appears to be complete. The work is necessarily of an academic nature as the author is a descriptive and not a clinical psychologist. There is, therefore, practically, no reference to the discoveries of Freud and his school.

Proceedings of the Royal Society of Medicine.

SUPPLEMENT

(Vol. XI, No. 9, July, 1918).

NOTES ON BOOKS.

[*The purpose of these "Notes" is neither to praise nor to blame, but merely to draw attention* o *some of the new books and new editions which have been added to the Society's Library.*—Ed.]

Amputation Stumps: their Care and After-treatment. By G. Martin Huggins, F.R.C.S. With 95 illustrations; pp. xv + 228. Price 7s. 6d. net. London: Henry Frowde, Hodder and Stoughton, 1918.

This monograph on the care and treatment of amputation stumps is one of the most valuable of the smaller contributions which have been made towards the problems of war surgery. The author sets out to review the modifications, which war experience has demonstrated as necessary in the current text-book teaching on amputations, and the innovations which his considerable experience as Surgical Specialist at the Pavilion General Hospital, Brighton, justify him in recommending and inculcating. He has succeeded in presenting a very fascinating little book which abounds with valuable suggestions, ideas and results for the war surgeons. There are seven chapters, of which two are devoted to general discussion, three to stumps, and one on joint deformities. A very interesting chapter on sinuses and necrosis of bone completes the book. There is scarcely a dull page. Much of the advice given is invaluable, and its knowledge practically indispensable to the operating surgeon of to-day. The Furneaux Jordan amputation is rightly condemned. The remarks on the inadvisability of Syme's amputation in the presence of sepsis, on short guillotine amputation thigh stumps, on when to operate or to refashion stumps, and on the cause and treatment of sinuses, may be selected out of the stock of excellent advice as those which should obtain the widest surgical currency. This book deserves to be widely read as the surgical teaching is sound. From the national investment point of view it would be a wise statesmanlike innovation if the Ministry of Pensions had this book distributed amongst all the operating surgeons in France.

Edible Oils and Fats. By C. Ainsworth Mitchell, B.A., F.I.C. Pp. xii + 159. Price 6s. 6d. net. London: Longmans, Green and Co., 1918.

This book is one of the series of monographs on industrial chemistry. It gives a concise account of the chemical composition and properties of the more important edible oils and fats, together with a description of the methods of extracting them from the crude materials and of purifying and preparing them for food purposes. A chapter dealing with the physical and chemical methods of examining edible oils is also included. The principles rather than the details of well-known analytical methods are given, whilst for the benefit of the expert fuller descriptions of the more recent methods and those which have not yet found their way into the text-books are included. A chapter on the nature and properties of margarine is of special interest at the present moment. A very full bibliography is appended.

Principles of General Physiology. By William Maddock Bayliss, M.A., D.Sc., F.R.S. Second edition, revised. With 261 illustrations; pp. xxxiv + 858. Price 24s. net. London: Longmans, Green and Co., 1918.

By "general" physiology the writer of this well-known text-book means "the study of the endowments of living material," and his aim has been to produce a book which might be of service to all desiring a general, elementary treatment of what may be called "abstract physiology" as opposed to the "applied physiology" required by the agricultural, medical or veterinary student for the purpose of his profession. This, the second edition, has followed the first after an interval of two years, but owing to the War no very great amount of work requiring reference in such a book has been produced in the interval. In the case of some aspects of the activity of muscle, of the kidney, and of the visceral nervous system, however, new facts or changes in point of view have necessitated considerable re-writing. A new section on the transport of carbon dioxide in the blood has been inserted and a portrait of Pasteur has been added to the numerous interesting illustrations. The bibliography is very complete and extends to more than 80 pages.

Military Medical Manuals. General Editor: Sir Alfred Keogh. G.C.B., M.D., F.R.C.P. Fracture of the Lower Jaw. By L. Imbert and P. Real. With a Preface by Medical Inspector-General Février. Edited by J. F. Colyer, F.R.C.S., L.D.S. With 97 illustrations and 5 plates; pp. xxii + 189. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

This manual, the joint work of a Surgeon and a Dental Surgeon, indicates the specialization necessary to the treatment of injuries of the mandible. Due credit is given to the pioneer work of Claude Martin, who, "alone by his patient investigations and his undeniable genius, was able to evolve the basic principles of this branch of surgical science." Dental adjustment (occlusion) and mandibular rigidity are the fundamental conditions aimed at, and the authors claim that "union is more important than occlusion." Considering the seriousness of these injuries, the mortality, owing to the mastery of this branch of surgery, barely reaches 1 per 1,000. Some pages are devoted to the physiological peculiarities of the bone. The special feature in the ætiology of war wounds is the splintering, although some of the fractures are similar to the accidents met with in civil life. A third division is added to the usual classification of anterior or posterior fractures—viz., fractures of the vertical portion or ascending ramus. In diagnosis, four stages are recorded: The first, a few days, when serious complications, infective conditions, dyspnœa, &c., occur, and treatment aims at the preservation of life. Tracheotomy is condemned. The second, "recent," from one month to two, preparatory; the third, "old," which may last from six months to a year, is really the active stage of treatment; and the fourth, the treatment of pseudo-arthrosis or mal-position, if present. Good illustrations accompany the text indicating the correct method of examination. The chapter on radiography has a diagram of interpretation with skiagrams of typical cases. The mechanical treatment is also well illustrated with all the most recent appliances which have been evolved and proved serviceable in the present war. The effectiveness of these is based on sound surgical procedure. Surgical treatment is so rarely necessary that the authors who for eighteen months have had a minimum of 150 patients, have only treated eighteen by the surgical method. In seven of these it was successful, eight unsuccessful, and in three recent. The book concludes with a chapter on "The Assessment of Disabilities," which may be described as judicious and conscientious.

The Theory and Use of Indicators: an Account of the Chemical Equilibria of Acids, Alkalies and Indicators in Aqueous Solution, with Applications. By E. B. R. Prideaux, M.A., D.Sc. Pp. xii + 375. Price 12s. 6d. net. London: Constable and Co., Ltd., 1918.

This volume is written primarily for the physical chemist and in language which he will best understand, but it is to the honour of the biological chemist, and all interested in the knowledge of those delicately balanced fluids in which living organisms carry on their activities, that the researches here described arose and were brought to fruition in biological and physiological laboratories. That delicately balanced regulation of hydrogen and hydroxyl ionic concentration which protects the living cells and prevents their injury or death was first described in Britain, appearing in papers issued from the Bio-chemical Laboratory of the University of Liverpool, as well as practical methods for estimating quantitatively the degree of protection. The subject was afterwards mainly elaborated in Denmark and the United States, but because of that international toll which Germany subtly levied on the publication of scientific literature, the main findings of two of the chief investigators, Henderson, of Harvard, and Sörensen, of Copenhagen, were published in German in "Ergebnisse der Physiologie." It is therefore gratifying to find such a monograph as this now at length published in English and the earlier British work in part rescued from that obscurity into which it had passed. The subject of regulation of reactivity of the body-fluids has recently come into prominence in relationship to respiratory regulation, breathlessness in the "effort syndrome," surgical shock and nervous exhaustion. Although this volume is necessarily somewhat mathematical in its treatment of theory, the main facts can be gathered by any reader, and some of these are fundamental in modern conceptions of the physico-chemical science underlying practical medicine.

THE ORGANISM AS A WHOLE FROM A PHYSICOCHEMICAL VIEWPOINT. By JACQUES LOEB, M.D., Ph.D., Sc.D. With 51 illustrations; pp. x + 379. Price $2.50. New York and London: G. P. Putnam's Sons, 1916.

This book is a further contribution from its well-known author on the problems of life from a mechanistic point of view. He deals with his subject in a series of chapters on the specific difference between living and dead matter and the question of the origin of life, the chemical basis of genus and species, and specificity in fertilization. He then goes on to treat of artificial Parthenogenesis, an experimental piece of work to which he has devoted himself for many years, especially as regards sea-urchins. Then there are chapters on Determinism in the Formation of an Organism from an Egg, Regeneration, Determination of Sex, Mendelian Heredity, Animal Instincts, Influence of Environment and adaptation thereto, concluding with remarks on Death and Dissolution of the Organism. Coming from the pen of a scientific investigator of acknowledged eminence, the book is well worth reading and pondering. In his preface (August, 1916) reference is made to "the wave of homicidal emotion (*sic*) which has swept through the world," *sans plus*. Dr. Loeb should be reminded that it was the ruthless, criminal German, who started it by invading peaceful countries and creating the world's record in sanguinary cruelties and unheard-of destruction. The author mentions Voltaire in his preface and dedicates his book to him among others. But Dr. Loeb should read Voltaire's masterpiece of irony, "Candide," and see what he thought of "le roi des Bulgares" of Potsdam.

ROLL OF COMMISSIONED OFFICERS IN THE MEDICAL SERVICE OF THE BRITISH ARMY WHO SERVED ON FULL PAY WITHIN THE PERIOD BETWEEN THE ACCESSION OF GEORGE II AND THE FORMATION OF THE ROYAL ARMY MEDICAL CORPS—20 JUNE, 1727, TO 23 JUNE, 1898. With an introduction showing the Historical Evolution of the Corps, by the late Colonel WILLIAM JOHNSTON, C.B., M.A., LL.D.Aberd., M.D.Edin. Edited by Lieutenant-Colonel HARRY A. L. HOWELL, R.A.M.C. Pp. lxxii + 638. Aberdeen: The University Press, 1917.

This roll contains the names and records the appointments of 7,601 officers of the British Army Medical Service during the period mentioned in the title page. The labour and research involved in compiling such a work must have been immense, but the author died before it was completed, and the duty of editorship fell upon Lieutenant-Colonel Howell, to whose discriminating judgement the volume was entrusted. But the roll, which occupied the author ten years or more in producing, is not the only feature of the work. In an introduction reference is made to the history of the British standing army beginning in the reign of Charles II, and of the service medical arrangements which were then called into being. It traces the development of the service through the maze of successive Royal Warrants up to the position which it now occupies. In that development the author, during recent times, played a conspicuous part. To him was mostly due the fact that the medical service became a corps in the army. The introduction, in short, is a valuable contribution to army medical history, reflecting the strenuous efforts made by its officers to place the service upon a proper footing, despite military opposition. An index of 49 pages furnishes the reference to each officer included in the roll.

Human Physiology. By Professor Luigi Luciani. Translated by Frances A. Welby. With a Preface by J. N. Langley, F.R.S. In five volumes. Volume IV: The Sense Organs. Edited by Gordon M. Holmes, M.D. With illustrations; pp. x + 519. Price 21s. net. London; Macmillan and Co., Ltd., 1917.

This volume is mainly historical and contains an admirable account of the earlier work on the Special Senses. In the first chapter the author deals with cutaneous sensibility, and the chapter is completed by a short editorial note on Head's observation with regard to protopathic and epicritic sensation. This is followed by chapters on the sensibility of the internal organs, and the sensations of Taste, Smell, and Hearing. The functions of the different parts of the organ of Corti are discussed at length, and the author adopts the view that the hair cells are stimulated by vibrations of the tectorial membrane and not of the basilar membrane. The chapter on Vision contains an excellent account of colour vision, but it is curious that the author makes practically no reference to intra-ocular pressure. One of the most interesting chapters is that on psycho-physical phenomena, such as subliminal consciousness and sleep. The author discusses at length the various theories of sleep which have been brought forward, and finally adopts that of Claparède, who believes that its cause is purely psychological, and consists in " the reaction of indifference to the present situation."

Military Medical Manuals. General Editor: Sir Alfred Keogh, G.C.B., M.D., F.R.C.P. Fractures of the Orbit and Injuries to the Eye in War. By Felix Lagrange. Translated by Herbert Child, Captain R.A.M.C.(T.). Edited by J. Herbert Parsons, Captain R.A.M.C. With 77 illustrations and 6 plates. Pp. xix + 248. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

The enterprise of the University of London Press in bringing this valuable series of French authors within reach of English readers is worthy of all praise. For all time this series will reflect commendation upon our allied colleagues in the medical service of the French army, and not least because the volumes have been compiled during the progress of the war, thus making the new experience gained from it quickly available for dissemination. The volume before us is typical of the instructional value of the observation of war lesions, of which, in their varied form, this war has been so productive. But within the space at disposal it is quite impossible to deal in any sense adequately with the new teaching brought under review; the book must be read. A careful perusal will well repay the reader, because of the large field of ophthalmic work over which the title " Fractures of the Orbit " travels. The author gives a tabulated result of 609 cases of this lesion out of 2,554 wounds inflicted in war. The plates illustrative of the ophthalmoscope appearances of concussion effects in the fundus include a curious variety of changes. The list of case reports is as various as it is interesting.

Military Medical Manuals. General Editor: Sir Alfred Keogh, G.C.B., M.D., F.R.C.S. The After-Effects of Wounds of the Bones and Joints. By Aug. Broca. Translated by J. Renfrew White, M.B., F.R.C.S., Temporary Captain R.A.M.C. Edited, with an Introduction, by R. C. Elmslie, M.S., F.R.C.S., Major R.A.M.C.(T). With 112 illustrations; pp. xviii + 244. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

The author in Chapter I emphasizes the fact that apparently healed war wounds often recrudesce both spontaneously and after operations. Chronic lesions only are dealt with. One of these resulting in the loss of pronation and supination is caused by treating forearm fractures in semi-pronation, another in synostosis of the forearm bones. Osteotomy must be abstained from whenever possible and performed at a late date when indispensable in view of the tendency to recrudescence of infection which is much greater in war fractures than in compound fractures of civil life. Osteotomy is less dangerous than osteoclasis. Early interventions are necessitated by nerve lesions. This chapter concludes with a consideration of excessive callus, false-joints, loss of bone and their effects. Chapter II deals with chronic osteomyelitis in amputation stumps and compound fractures and the radiographic and clinical study of the bone-changes; Chapter III deals fully with the treatment of chronic septic osteomyelitis and the *rationale* thereof is given historically and practically in detail: Chapter IV is on the after-effects of wounds in joints, muscles, and tendons: ankylosis being defined as any limitation of movement of a joint and the pathology and treatment described the indications and contra-indications for massage &c., and the mechanism of false-joints being given fully. The last chapter deals with medico-legal considerations. The illustrations are clear and the different objects are reduced to the same size and kind of picture, the illustrations being of the same character as those reproduced below from Leriche's book.

Military Medical Manuals. General Editor: Sir Alfred Keogh, G.C.B., M.D., F.R.C.S. The Treatment of Fractures. By R. Leriche. Edited, with a Preface by F. F. Burghard, C.B., M.S.Lond., F.R.C.S. In two volumes. With 253 illustrations; pp. xxxiii + 207 and xxvi + 305. Price 6s. net each vol. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

The author planned this book, Vol. I, "Fractures Involving Joints," as a handbook of the treatment of joints in which was to be indicated for each joint the mode of carrying out the treatment during the different stages through which the wound passes. The chief operative measures are recommended to be done at the Front, all joint-wounds that are not clean bullet-wounds being laid open, resections when necessary being carried out and loose fragments of bone removed. The injuries possible at each joint are considered under six headings: (1) Anatomical types of injury and their clinical development; (2) Therapeutical

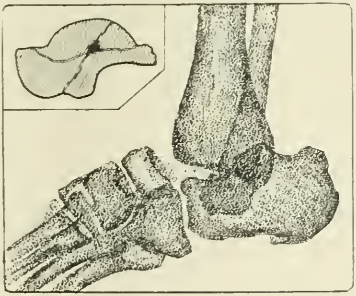


Fig. 83.

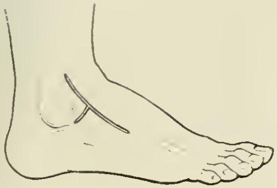


Fig. 86.

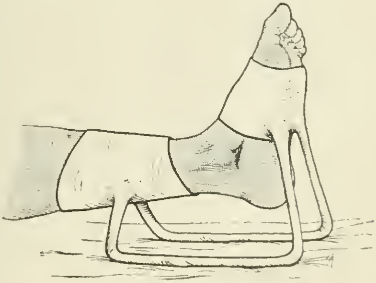


Fig. 88.

indications at the Front in the first twelve hours; (3) Technique necessary to secure a useful limb; (4) Post-operative treatment; (5) Conditions under which patients should be evacuated; (6) Treatment in cases seen at a late period after injury. This scheme is carried out with the greatest clearness of description aided by ample illustrations, of which three examples are here reproduced: Fig. 83, Primary resection of astragalus for fracture by bullet; Fig. 86, External incision for resection of astragalus; Fig. 88, Interrupted plaster casing after resection of astragalus. In Volume II the author deals with gunshot fractures of the shafts of the long bones. The principle of treatment is the same as that adopted by the authors in gunshot fractures into joints: "Fractures, like all properly treated gunshot-wounds, should not suppurate if they are speedily cleansed; esquillectomy (removal of fragments) suffices to ensure this in the fracture, as does excision in wounds of the soft parts. The case should be removed at once from all risk of infection, and nothing should subsequently be permitted to interfere with the normal function of bone-forming elements at the seat of fracture." The above is an extract from the author's introduction which states Ollier's teaching as to subperiosteal resection of bone and its application to military surgery. Of the mechanical methods the author writes: "I have shown in the case of each type of fracture the means by which I am accustomed to prevent movement; I have proposed only simple, well-tried devices, which are easily improvised." The book contains a systematic treatise in which examples of every class of gunshot fracture is described in full detail, the above-mentioned principle being applied to the majority of cases, but with many instances of cases dealt with on the drainage and splinter-conserving plan more commonly adopted by British surgeons.

THE ERRORS OF ACCOMMODATION AND REFRACTION OF THE EYE AND THEIR TREATMENT. A Handbook for Students. By ERNEST CLARKE, M.D., F.R.C.S. Fourth edition. Pp. vii + 243. Price 6s. net. London: Baillière, Tindall and Cox, 1918.

This new edition of the author's book has been thoroughly revised and brought up to date, while many chapters have been re-written. It seems unnecessary to say more in regard to a work for which, it is evident, a constant demand has been created. That demand has arisen from the practical way in which the subject is dealt with, and the strict adherence to the inclusion of only essential points.

MILITARY MEDICAL MANUALS. General Editor: Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.S. HYSTERIA OR PITHIATISM AND REFLEX NERVOUS DISORDERS IN THE NEUROLOGY OF WAR. By J. BABINSKI and J. FROMENT. Translated by J. D. ROLLESTON, M.D. Edited, with a Preface, by E. FARQUHAR BUZZARD, M.D., F.R.C.P., Captain R.A.M.C. (T.). With 37 figures and 8 plates; pp. xxii + 311. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

In this book Babinski's well-known theory of hysteria is applied to war findings and the authors endeavour to show that pithiatism is amply confirmed therein. The book starts with an historical survey of the old conceptions of hysteria, but only the views of French neurologists are given. This is followed by a chapter on symptomatology with which all readers will be more or less conversant. Part II is devoted to a discussion on "Reflex Nervous Disorders," which have been found to be a not infrequent complication of war injuries. It is herein admitted that the pathogenesis is still unsettled but they are regarded as a special group, half way as it were between organic affections and hysterical disorders. First the various views on these conditions are discussed and then the signs and symptoms such as paralysis, contracture, vasomotor and thermal changes, muscular hyperexcitability and hypotonus, amyotrophy, reflex changes, tremor and secretory and trophic disorders are dealt with. In the following chapter the pathogeny is enlarged upon and the authors combat the theories that immobilization and ascending neuritis can account for these disorders, but regard them as due to reflex irritation of centripetal nerve filaments at the seat of trauma, and hence akin to the views of Vulpian and Charcot on reflex disorders as met with in osteo-arthritic lesions. In Part III the differential diagnosis of organic disease, hysteria and reflex disorders is tabulated out most usefully. Treatment is not enlarged upon but highly important advice is added as to the attitude best adopted by the army authorities to sufferers from these special ailments. In an Appendix a summary is given of observations made on special points of the reflex disorders which were investigated. The plates and figures in the book greatly enhance its value.

LE TRAITEMENT DE LA SYPHILIS PAR LES COMPOSÉS ARSENICAUX. Par le Dr. LACAPÈRE. Pp. vii + 199. Price 4 fr. 95. Paris: Masson et Cie, 1918.

This book is, as its name implies, an epitome of the treatment of syphilis by means of the arsenical compounds. It contains nothing new, but the English reader will find therein all he wishes to know concerning Danysz's latest new drug, luargol. The theory of the action of the chemo-therapeutic drugs is still that of the German teaching. The prevention and treatment of the toxic manifestations are discussed, but not exhaustively. Chapter III deals with the incidence of accidents. Leredde and Jansin collected from the literature 211 fatal cases between October, 1910, and December, 1913. One chapter is devoted to the dark ground illumination, &c., and to the Wassermann reaction.

MILITARY MEDICAL MANUALS. General Editor: Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.P. SYPHILIS AND THE ARMY. By G. THIBIERGE, Surgeon to the Saint-Louis Hospital. Edited by C. F. MARSHALL, M.D., F.R.C.S. Pp. xxii + 210. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

This book is particularly interesting, as it is one of the few written of late years which tackles the subject from the clinician's and not the pathologist's point of view. The author goes so far as to say, that a naked-eye diagnosis of a sore is superior to a microscopic examination, and that the Wassermann reaction is valueless by which to regulate treatment. The author is insistent on the continuation of treatment in a milder form after the initial intensive course, which he aptly terms, the "treatment of attack." Although due place is given to the arsenical preparations, much favour is shown for the intravenous administration of mercury cyanide. As to the ultimate results of the new methods of treatment a note of caution is struck. As the author has not been led away by the German teaching, and is undoubtedly sceptical about parts of it, the book should most certainly be read by those who think the present-day views on syphilis constitute the last word.

ASPECTS OF DEATH AND CORRELATED ASPECTS OF LIFE IN ART, EPIGRAM, AND POETRY: CONTRIBUTIONS TOWARDS AN ANTHOLOGY AND AN ICONOGRAPHY OF THE SUBJECT. Illustrated especially by Medals, Engraved Gems, Jewels, Ivories, Antique Pottery, &c. By FREDERICK PARKES WEBER, M.A., M.D., F.R.C.P., F.S A. Third edition, revised and much enlarged. With 145 illustrations; pp. xl + 784. Price 30s. net. London: T. Fisher Unwin, Ltd.; Bernard Quaritch, Ltd., 1918.

This volume is an old friend in a new and ampler dress: in essence it is an attempt to show the attitude of the human mind in all ages towards the questions of death and the long thereafter. Illustrations derived from a wide and variegated field of epigram, poetry, medals, engraved gems, jewels, and the like are employed to show how these ideas have affected the living individual. The whole subject falls into four parts, to each of which a book is devoted, the first taking the place of an introduction to the whole. Part I opens with a sketch of the philosophical ideas of the ancients on these questions: perhaps, in the inevitable future edition the author, who takes all time for his theme, will see fit to erase the qualification "among the Ancients," so that Sir G. M. Humphry and William Watson may rub shoulders with Horace and Martial without sense of incongruity. He shows how the orthodox religious teaching of mediaeval Europe introduced fresh and horrible features into the picture of death, quite foreign to the more peaceful conception of the ancient world. "Memento mori" becomes the motto of the age: we have come to the Danse Macabre, the Vado Mori poems, and the Ars Moriendi designs. The same admonition of the hatefulness and imminence of death he traces in the record of sepulchral monuments and inscriptions. With Petrarch's "Trionfi" as its inspiration, the theme undergoes some modification in the art of the Italian Renaissance, and leads to the appearance of the manifold designs of the Triumph of Death. The section concludes with a survey of the presentation of death in modern art, and a comparison of modern with mediaeval ideas on the subject. In Part II the various possible aspects of death and the varying mental attitudes towards the idea of death are arranged and analysed : the author explains and classifies the headings under which the illustrative works of art may be conveniently grouped. An abbreviated summary of these will indicate both the scope of the work and the breadth of view with which he envisages his subject : (1) The Memento Mori idea ; (2) Death as the threshold of a future existence ; (3) Survival after death in the minds of others ; (4) Death as a friend ; (5) Death as a punishment ; (6) Death as an emblem of stubborn purpose in war ; (7) Death as an emblem of destruction ; (8) Death as a conqueror and leveller : (9) Scientific attitudes towards death ; (10) Medical, sanitary, and social attitudes ; (11) Death for the good of others, or for the sake of duty or honour ; (12) The Epicurean attitude ; (13) Contemplative attitudes ; (14) Death as an incentive to right living ; (15) Death and Love ; the praise of death ; (16) Predestination and the free will in regard to aspects of death ; (17) Death from the standpoint of pessimism in regard to life ; (18) Grief for the death of others ; (19, 20) Attributes and pomp of death ; (21) Death in grotesque art. Each of these respective aspects is profusely illustrated by quotations from literature and representations from art. Seeing that the author draws so much of his illustration from literature, it would perhaps be well to substitute "List of Plates" for "List of Illustrations" in enumerating the figures in the text. Part III, dealing with coins, medals, and medal-like tokens relating to death and to the various aspects of and attitudes towards death enables the author to display his intimate knowledge of a subject that he has made peculiarly his own. Indeed, we may recall that the first edition of this book had its origin in a series of articles contributed by the author to the *Numismatic Chronicle*. Part IV is closely akin to the previous section, and carries on the field of illustration to engraved gems, finger-rings, jewels, ancient pottery, and other small objects of art. The book is turned out in excellent clear type and on a paper that, for war-time, is surprisingly good, while for clearness the figures are all that can be desired.

PRACTICAL ORGANIC AND BIO-CHEMISTY By R. H. A. PLIMMER, Reader in Physiological Chemistry, University of London. New and revised edition. With coloured plate and other illustrations. Pp. xii + 636. Price 18s. net. London : Longmans, Green and Co., 1918.

The third edition of this text-book is arranged on the same plan as its predecessor, which appeared as recently as 1915, but several sections have been re-written and the whole work has been thoroughly revised. The rapid advances made in recent years in bio-chemical methods, especially in America, must have made the task of revision no easy one, but most of the new or improved methods of preparation and analysis seem to have been incorporated in the text without increasing the size of the book. Although written originally, and still mainly intended, for medical students, it is a text-book that will be equally useful for all students of biology, since the chemistry of the organic substances met with in plants as well as animals is dealt with. In order to differentiate the botanical and more advanced portions of the work they are printed in smaller type, while the more important practical experiments are indicated by asterisks. The list of special re-agents given at the end of the book renders it particularly useful for reference, and the list of re-agents of standard concentration, &c., should do much to bring about the desirable uniformity among different workers that is so conspicuously lacking at the present time.

MILITARY MEDICAL MANUALS. General Editor : Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.P. MALARIA IN MACEDONIA : CLINICAL AND HÆMATOLOGICAL FEATURES AND PRINCIPLES OF TREATMENT. By P. ARMAND-DELILLE, P. ABRAMI, G. PAISSEAU and HENRI LEMAIRE. Preface by Professor LAVERAN. Translated by J. D. ROLLESTON, M.D. Edited with a Preface by Sir RONALD ROSS, K.C.B., F.R.S., LL.D., D.Sc., Lieutenant-Colonel R.A.M.C.(T.). Pp. xxx + 115. Price 6s. net. London : University of London Press, Ltd. ; Paris : Masson et Cie, 1918.

The title of this volume does not imply that the malaria met with in Macedonia was of a special nature, but merely that the authors are describing their experiences of an outbreak which occurred among the troops in that locality. Two chapters are devoted to the parasitology of the disease, with concise instructions on practical details of the diagnosis of malaria from stained blood films, but the bulk of the work deals with symptomatology and treatment. Attention is drawn to the severity of the disease, the frequency of multiple infections, and the prevalence of types of the disease resistant to quinine. The various syndromes occurring in the course of the disease are described in considerable detail. The treatment advocated is mainly along the usual well-known lines, with reference to the intravenous method of administering quinine. In the Preface Sir Ronald Ross deals with the authors' conclusions, especially their view that quinine should be withheld between the relapses. The book is well written, in a clear modern style, and should retain the interest throughout both of the general practitioner and of the specialist.

WELFARE WORK: EMPLOYERS' EXPERIMENTS FOR IMPROVING WORKING CONDITIONS IN FACTORIES. By E. DOROTHEA PROUD, B.A.(Adel.). With a Foreword by the Rt. Hon. DAVID LLOYD GEORGE, P.C. Pp. xx + 368. Price 7s. 6d. net. London: G. Bell and Sons, Ltd., 1916.

Miss Proud, who has had a large experience of factory conditions in Australia, New Zealand, and elsewhere, was sent to this country from South Australia as Spence Scholar in Sociology, and selected welfare work as the subject of her study. In her opening chapters, Miss Proud deals with the employers' influence on factory legislation, changes in industrial legislation, and the development of the employers' attitude towards factory legislation. These chapters are largely historical, and contain a good outline of the evolutionary process which has led up to the present position. In the succeeding chapters the ideals of the workers and the importance of a Welfare Department in factories are examined. The second part of the book deals with the relation of work to workers, wages and hours, and incidental aids to welfare, such as recreation, food, baths and housing. A number of appendices dealing with different aspects of the subject complete the volume. Miss Proud's investigation has been of an exhaustive character, and her book contains information which will be of much value to all who are concerned with the protection of workers and the development of industry along humane and enlightened lines.

MILITARY MEDICAL MANUALS. General Editor: Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.P. ARTIFICIAL LIMBS. By A. BROCA and DUCROQUET. Translated and edited by R. C. ELMSLIE, M.S., F.R.C.S., Major R.A.M.C.(T.). With 208 illustrations. Pp. xx + 160. Price 6s. net. London: University of London Press, Ltd.; Paris: Masson et Cie, 1918.

This volume of the valuable series produced under the editorship of the late Director-General contains a clear and concise account of the principles of prothesis as applied to artificial limbs, especially in France, with notes on points of difference between French and British practice. It deals concisely but clearly with the principles on which an artificial limb should be constructed, with the materials for the same and the methods of manufacture and fitting. Various appliances for use with artificial arms in place of the lost hand are described and illustrated.

THE ACTION OF MUSCLES, INCLUDING MUSCLE REST AND MUSCLE RE-EDUCATION. By WILLIAM COLIN MACKENZIE, M.D., F.R.C.S., F.R.S.Edin. With 99 illustrations; pp. xvi + 267. Price 12s. 6d. net. London: H. K. Lewis and Co., Ltd., 1918.

The scope of this book is well represented by the title. Dr. Mackenzie attaches little importance to electrical reactions or to electro-therapeutics of muscles. Volitional tests properly applied, and volitional treatment, are in his opinion all important. Physiological rest of damaged muscles is insisted upon. The generally accepted views as to the action of some important muscles are rejected by the author, who has strong and definite views on these and some other points. The anatomy of the muscular systems of some Australasian marsupials affords apt illustrations of the functions and of the past and possible future development of human muscles. The value of carefully devised and systematic re-education of so-called paralysed muscles is well brought out.

HEALTH AND THE STATE. By WILLIAM A. BREND, M.A.Camb., M.D. (State Medicine), B.Sc.Lond. Pp. xi + 354. Price 10s. 6d. net. London: Constable and Co., Ltd., 1917.

"To trace the reasons for the failure to make the best use of the Medical and Public Health knowledge is the main object of the book." The author epitomizes in Chapter I the history of the relation of the State to Public Health, the relation of Health to the Welfare of the Empire; and. at the close of the chapter, the reasons for the failure to make the best use of this knowledge. Infant Mortality is the subject of Chapter III, and the various aspects of the question thoroughly discussed. This chapter has also appeared in a publication of the Medical Research Committee. Workers in health problems will find the chapter full of interest, though, perhaps, those who have intimate knowledge of high infantile mortality in agricultural districts will not entirely agree with the conclusions reached. Defects of school children, tuberculosis, syphilis, cancer, are among the problems discussed in Chapter IV, and the author truly states: "The review in this and the preceding chapter of the state of Public Health in England at the present day shows that the condition of large masses of the population is thoroughly unsatisfactory if measured by the healthiest communities." Another chapter is devoted to the relation of Public Health to Land and Housing. Chapter VI is devoted to medical treatment among the working classes, in institutions, and by the general practitioner, and has a very interesting section on a pressing question of the day, "General Practitioner or Midwife?" The relation of Public Health to the National Health Insurance Act is fairly discussed, with a careful examination of "Medical Benefit" and "Sanatorium Benefit." The complexity of the Public Health problem, with the need for a Ministry of Health and its relation to Local Authorities take up three chapters. The case for a separate Ministry of Health is exceedingly well made out, and emphasis is also laid on the need of proper co-ordination among local authorities. It is very properly insisted that a "local authority is concerned with a definite geographical unit, and a community of persons all subject to more or less the same conditions, and it is wasteful and inefficient to have a number of unco-ordinated bodies, local sanitary authorities, insurance committees, boards of guardians, and local education authorities, each concerned with a special section of the community, as though it were in a water-tight compartment. These should be replaced by a single body or Local Health Council as it might be termed." If this were realized it would be a tremendous step forward in local health administration. This is a book that should be studied by all concerned in health work, particularly medical men serving on health or allied committees.

THE TRAINING AND REWARDS OF A PHYSICIAN. By R. C. CABOT, M.D. With 8 illustrations; pp. 153. Price $1.25. Philadelphia and London: J. P. Lippincott Co., 1918.

This volume of Lippincott's training series is designed for those intending to enter the medical profession so that they may know how to fit themselves for its divisions—namely: (*a*) The research and teaching man, the "professor"; (*b*) the general practitioner—the guide and counsellor of his patients; (*c*) the expert middleman or specialist who becomes an efficient machine for applying in diagnosis and treatment the science worked out by the first group; and (*d*) the public health officer or sanitary engineering type of medical man. These groups are described clearly and not without humour. Speculation and verification, the two essentials for scientific progress, are not always found in the same person, and the extreme value of scientific imagination has perhaps received less attention than the experimental or verifying side, which is prone to be arid without the rare capacity of having ideas worth testing, as is abundantly shown by the theses yearly presented for the Ph.D. degrees, which often contain "original work—but work not worth doing." In the section on the general practitioner, Dr. Cabot says that there is no longer any necessity for his countrymen to go abroad for post-graduate study, as the American post-graduate instruction has now caught up and passed that for which they formerly went to Germany, Paris or London, and that the majority who have in recent years gone to Europe have wasted their time. The need for instruction in the human side of medical practice—a subject not taught in the medical schools—is insisted on, and the way in which it may be learnt is shown. The second part of the book deals with the helps and hindrances in the doctor's development, and discusses the causes of failure, the factors of success, country and town practice, and the various forms of quack medicine, the two latest of which—the chiropractor and the Chinese herb doctor—have not yet taken root over here, as far as we know. The influence of important public health crusades, such as that against tuberculosis, on medical development and medical practice is considered, and then attention is drawn to the private practitioner's competition with group or team medicine—namely, the work done in hospitals or by the Mayo brothers at Rochester, Minn. The third and concluding part is devoted to the rewards of medical work, and these, though not wealth or fame, are in Dr. Cabot's opinion, beyond those of any other profession.

SURGICAL THERAPEUTICS AND OPERATIVE TECHNIQUE. By E. DOYEN. English edition prepared by the Author in collaboration with H. SPENCER-BROWNE, M.B.Cantab., &c. Volume II. With 982 illustrations; pp. viii + 680. Price 25s. net. London: Baillière, Tindall and Cox, 1918.

The subjects dealt with in this volume, in continuation of the part devoted to regional surgery, are the remaining part of operations on the head, and operations on the thorax, the upper and the lower limbs. The selection of matter, both as regards text and illustration, is peculiar to the author. The illustrations include the reproduction of photographs, and anatomical drawings. Many of the illustrations suggest methods which differ from those in vogue in this country. The illustrations of plastic operations requisite for repair following removals of epithelioma from the face, and after the wide incision of a cancerous breast are worthy of note. The illustrations concerned with the removal of thyroid tumours may be consulted. Among novel instruments the forceps for compressing the arteries of a limb when amputating may be found useful.

THE TREATMENT OF WAR WOUNDS. By W. W. KEEN, M.D., LL.D., Major Medical Research Corps, U.S. Army. Second edition. With 53 illustrations; pp. 276. Price $1.75. Philadelphia and London: W. B. Saunders Co., 1918.

Dr. W. W. Keen, of Philadelphia, has, in this second edition, and in a small compass, given an exceedingly good account of the developments which have taken place in the treatment of wounds during the War. The improved means of transporting the wounded, the avoidance and treatment of shock amongst other ways by the transfusion of blood, the treatment of fractures in particular by various modifications of the original Thomas's knee-joint splint, the Carrel-Dakin method followed by secondary suture, the incision of injured margins followed by primary suture, the localization and removal of foreign bodies at the first examination of the wound, the prevention of tetanus and its treatment by intraspinal injection, the early anticipation and arrest of gas gangrene, the primary treatment of wounds of the head, chest, abdomen and knee-joint, the relief which can be afforded in the case of burns. All these important matters are noted. Quotations from the original communications and personal letters authenticate the statements.

FIBROIDS AND ALLIED TUMOURS (MYOMA AND ADENOMYOMA): THEIR PATHOLOGY, CLINICAL FEATURES AND SURGICAL TREATMENT. By CUTHBERT LOCKYER, M.D., B.S., F.R.C.P., F.R.C.S. With an Introductory Notice by ALBAN DORAN, F.R.C.S. With 316 illustrations, including 37 coloured plates; pp. xix + 603. Price £3 3s. net. London: Macmillan and Co., Ltd., 1918.

In his preface Dr. Lockyer states that he has tried to prove that morbid anatomy is not entirely a lost science and so it is not surprising that the pathological as well as the clinical side has received full attention. The chapter of 45 pages in which the secondary changes in myoma are discussed is a full summary of the latest pathological knowledge. Some idea of the manner in which the work is illustrated may be gathered from the fact that these 45 pages have 53 coloured and a dozen black and white illustrations. The volume is divided into three parts—myoma, adenomyoma, and operations—and each part contains information of the highest value regarding obscure clinical points. The chapter headings of Part II show the detail with which the subjects are dealt with : they are adenomyoma, classification of uterine adenomyoma ; adenomyoma and pregnancy, adenomyoma and uterine malformation, cystic adenomyoma, adenomyoma and malignancy, adenomyoma and tubercle, diagnosis, prognosis and treatment. Till Dr. Lockyer interested himself in the subject of these tumours, no good and full account had been published in this country. It is unfortunate that, at the present time, the origin of these tumours is still the subject of discussion, as the full presentation of rival views takes up considerable space and even then does not lead to a final proof that one view is correct. The illustrations are good throughout, but especial attention may be directed to the coloured plates showing reproductions of histological sections which are printed on glazed paper in a manner equal to any pre-war publication. Dr. Lockyer has drawn freely on his own large clinical and operative experience and in discussing fully all methods of treatment, he frequently adds a personal note by stating his own preference. The final 50 pages are devoted to after-treatment of operations and the complications that may occur during operation. The author holds the view that is now generally accepted that the pelvic surgeon must be prepared without hesitation to excise adherent or damaged gut and to treat any surgical condition found in the abdomen that he has opened ; hence Dr. Lockyer gives a chapter on bowel excision and operations on the ureter.

MILITARY SURGERY. By DUNLAP PEARCE PENHALLOW, S.B., M.D.(Harv.), Major Medical Research Corps, U.S. Army. With Introduction by Sir ALFRED KEOGH, G.C.B. Second edition. With 226 illustrations; pp. xx + 555. Price 21s. net. London : Henry Frowde, Hodder and Stoughton, 1918.

This second edition brings down to the commencement of the present year what may be regarded as the foremost American work on the military surgery which is being practised in the present war. As compared with the first edition, the chief alterations are to be found under the heading of "Treatment of Wounds." The use of Dakin's solution followed by secondary suture on the one hand, and in application of primary suture after the excision of the injured margin, have both undergone developments. The large number of illustrations and the full index enhance the value of the work.

MILITARY MEDICAL MANUALS. General Editor : Sir ALFRED KEOGH, G.C.B., M.D., F.R.C.P. WOUNDS OF THE VESSELS. By L. SENCERT. Edited, with a preface, by F. F. BURGHARD, C.B., M.S.Lond., F.R.C.S. With 68 illustrations and 2 plates ; pp. xviii + 270. Price 6s. net. London : University of London Press, Ltd. ; Paris : Masson et Cie, 1918.

The book opens with an account of the characters of lesions of the vessels, and passes to general considerations of the type of missile, and the influence of sepsis. It is worthy of note that the author considers the vessels, in wounds submitted to primary excision at the proper period, perfectly suitable for direct suture ; he is not an indiscriminate advocate of suture, but indicates throughout the book circumstances and sites which in his opinion call for determined efforts to repair rather than ligature arteries and veins: ample evidence is forthcoming of the success of such efforts in carefully selected cases. In dealing with hæmorrhage, Professor Sencert explains the value of transfusion, describing at length the method of employing Elsberg's cannula. There is an account of clinical conditions due to punctured and other wounds, of arterial and venous hæmatomata, of the "dry" vascular wound, of aneurysms of all kinds, and of the general principles of treatment, as well as of the treatment of critical emergencies. The causation and course of arterio-venous connexions, and the immediate effect of contusions of large vessels are clearly explained. The second part of the book deals in detail with wounds of individual vessels, giving guidance of the greatest value based upon extensive experience. The translation is faithful and completes the great utility of a compact manual, covering the whole field.

INDEX

Proceedings of the Royal Society of Medicine, Vol. XI, 1918

INDEX

(Prepared by Mr. A. L. CLARKE, Assistant Editor)

Note.—The different parts of the Society's *Proceedings* are indicated by (i) M.B.L. (Marcus Beck Laboratory Reports), (ii) R.S.M. Lect. (Occasional Lectures), (iii) R.S.M. Discussion, and are placed first in the bound volumes under the heading "General Reports." They are followed by the *Proceedings* of the Sections, which are arranged alphabetically, each Section being separately paged. N.B.—The Section of History is printed as a separate Supplement, and is only supplied to those who make written application for it at the beginning of each Session.

Abderhalden, maintenance of nitrogenous equilibrium, quoted, Epid. 58
Abductor paralysis following gunshot wounds of neck, Laryng. 181
ABEL, A. L.—New laryngotomy and tracheotomy tube, Laryng. 110
Abortion, fatal uterine hæmorrhage in munition workers wrongly ascribed to, Epid. 157, 158
Abscess, extra-dural, perforating skull (R. Lake), Otol. 59
——, pre-tracheal, of acute development, producing dysphagia and dyspnœa (J. Dundas Grant), Laryng. 72
Accessory sinuses, nasal, disease of, infective, non-suppurative, Otol. 36.
—— —— ——, exploration before mastoid operation, Otol. 35
Accladiosis (A. Castellani), Derm. 12
——, ætiology, Derm. 14
——, clinical symptoms, Derm. 13
——, diagnosis, Derm. 15, 16
—— ——, from syphilis or yaws, Derm. 16
——, fungus of, microscopical appearances, Derm. 14, 15, 16
——, histopathology, Derm. 14
——, historical and geographical distribution, Derm. 12
——, prognosis, Derm. 17
——, treatment, Derm. 17
—— ——, local, Derm. 18
Accladium Castellanii, Derm. 14, 17
—— ——, cultures, Derm. 14, 15, 17, 18
Acne agminata of Radcliffe-Crocker (George Pernet), Derm. 10
——, keloid, case of (E. G. Graham Little), Derm. 51
—— scrofulosorum, case (E. G. Graham Little), Derm. 21
—— varioliformis, case (George Pernet), Derm. 10
Actinomyces, colony of, in crypt of tonsil (W. D. Harmer and A. C. Stevenson), Laryng. 161
Actinomycosis of tonsil, cases reported, Laryng. 162
ADAMSON, H. G.—Bullous urticaria in a baby, Derm. 38
——, case of pityriasis rosea with unusual features, Derm. 39
——, discussion on case for diagnosis, Derm. 72

ADAMSON, H. G.—Discussion on case of acne keloid, Derm. 53
——, discussion on case of circinate erythema, Derm. 4
—— —— —— of erythema ab igne, Derm. 54
—— —— —— —— multiforme perstans, Derm. 113
—— —— —— of extensive dermatitis, Derm. 46
—— —— —— of morphœa guttata, Derm. 95
—— —— —— of punctate keratosis of palms of hands and soles of feet, Derm. 90
——, histological and bibliographical notes on punctate keratosis of palms of hands and soles of feet, Derm. 85, 88
——, ? tumour of the parotids involving the skin, Derm. 73
Adenitis, tuberculous, aspiration preferable to extirpation in, Electr. 12
—— ——, value of X-ray treatment in, Electr. 12
Adenoid tissue, nasopharyngeal, tuberculosis of, percentage in those free from and those suffering with pulmonary tuberculosis compared, Laryng. 3, 4
—— —— removed from nasopharynx in case of lupoid tuberculosis of pharynx, histological report on, Laryng. 3
Adenoids, causing deafness, Otol. 29
——, operations for, cause of immediate improvement following, Otol. 29
——, recurrence, Otol. 37
——, removal, danger of, during suppuration of middle ears, Otol. 37
—— ——, followed by cessation of deafness, Otol. 37
—— ——, immediate relief of deafness after, Otol. 31
Adenoma sebaceum, vascular or telangiectatic (Pringle type), case (E. G. Graham Little), Derm. 25
—— —— —— —— —— —— treatment, Derm. 25
Adhesions, traumatic, definition, Electr. 55
Adrenalin chloride, small dose, in reduction of blood-pressure, Otol. 17
Adsorption in relation to process of calcification of hard tissues of teeth, Odont. 63, 64
Acro-asphyxia, Derm. 20
Acrocyanosis, Child. 26
—— as functional neurosis, Child. 26
——, associated with alimentary toxæmia, Child. 26
——, prognosis, Child. 26
——, see also *Erythromelalgia*
Agraphia and aphasia co-existing with mental capacity, Neur. 19
—— and apraxia, association without definite hemiplegia, Neur. 12, 14
——, aphasia and apraxia, association, Neur. 11, 14
——, variety of apraxia, Neur. 14
Agricultural families, daily amount of protein, fat and carbohydrate consumed by, Epid. 70
Agriculturists, pulmonary tuberculosis in, incidence, Epid. 145, 146
Air and bone conduction, relative, in tuning-fork tests, Otol. 5
—— and food passages, upper, compilation of comprehensive treatise on, advocated, Laryng. 28
——, injection into tympanum, method of restoring patency of Eustachian tubes, Otol. 17
—— passages, dentures aspirated into, cases reported, Odont. 108, 109
—— ——, foreign bodies impacted in, removal under bronchoscopy, results, Odont. 108
—— ——, teeth aspirated into, cases reported, Odont. 108, 109
—— —— —— —— —— ——, statistics, Odont. 109, 110
——, rarefaction in post-nasal space, Otol. 28, 29
Airman, aural vertigo and unilateral obstruction of Eustachian tube, without deafness in, Otol. 21, 22; result of hearing tests, Otol. 22
Air raids, recent, dermatitis due to high explosives used in, four cases (J. H. Sequeira), Derm. 12
Airway tube in administration of ether in home military hospitals, Anæsth. 5, 10
Ala, extreme collapse of (William Hill), Laryng. 129
——, new, making of, after destruction by gunshot wound, Laryng. 103
Alæ, nasal, loss, method of repair, Laryng. 87, 88

Alæ, tip and columella of nose, restoration of, Laryng. 103-105
Alanin, conversion into glucose in diabetic organism, Epid. 63
Albania, importation of typhus and relapsing fevers from, into Serbia, Epid. 31, 32
Albanian population, deported by sea, stamping out pestilence among, Epid. 49, 50
Albinus, remedies recommended by, Hist. 8
Albumen rations, average amount necessary, Epid. 41
—— ——, reduction without disturbance of metabolism or prejudice to health, Epid. 41
Alcohol, injections, contra-indicated in treatment of painful amputation stumps, R.S.M. Lect. 23
Alcoholism affecting prevalence of tuberculosis, Epid. 134
——, excessive mortality from all causes of death due to, Epid. 136
——, history, in cases of aphasia with mental disorder, percentage in both sexes, Neur. 5
Alexandria, plague epidemics (1835-43), course of, showing pseudo-periodicity, Epid. 104, 105
—— —— ——, values of β_1 and β_2 (symmetry and asymmetry and form of curves) for, Epid. 92
Alienists, consultation of, why necessary in certain cases in which aphasia is present, Neur. 3, 4
Alimentary canal, effects of T.N.T. poisoning on, Epid. 152, 156, 165, 167
Allahabad, plague epidemics, humidity in relation to size of, Epid. 107
—— —— ——, 1902-3, 1903-4, 1904-5, 1906-7, values of constants for, Epid. 108
Alopecia areata, factors in causation of, Derm. 62
—— ——, of ordinary type, non-contagious, Derm. 62
—— ——, two cases (S. E. Dore), Derm. 61
Althelmus or Aldelmus, St., poem of, containing references to St. Cosmas and St. Damian, Hist. 74
Alveolar tilting, in fractures of mandible, Odont. 39
Alveolus and teeth, fractured, treatment at jaw injuries centre, Odont. 12.
Amar, study of work performance, by Arab labourers, quoted, Epid. 69, 70
Amaurosis, following violent convulsions, case (Eric Pritchard), Child. 1, 14
—— —— —— ——, cause discussed, Child. 2, 14-16
Amblyopia due to di-nitro-benzol, Epid. 156
Ameloblast cells of marsupials, changes in, Odont. 65
Ameloblastic membranes, first description of, Odont. 58
—— ——, inner, formation, Odont. 58, 59
—— ——, penetration by fibrils of Tomes's processes, Odont. 58, 59
Amino-acids in digestion, use of, Epid. 57
Amnesia during twilight sleep in childbirth, Obst. 7, 8, 12, 18, 27. 28, 30, 34, 40, 42
—— —— —— —— ——, partial, Obst. 31-33, 34
——, twilight sleep a condition of, Obst. 3
Amputation at clavicle, section of nerve-bulb showing inflammatory nodule, R.S.M. Lect. 10, 11
——, double. of leg, for endothelioma, Path. 20
—— neuromata, characteristics of (G. Marinesco), R.S.M. Lect. 5
—— ——, composition of, R.S.M. Lect. 6
—— ——, foreign bodies in, results of, R.S.M. Lect. 6
—— ——, lesions accompanied by pain, infective nature, R.S.M. Lect. 6
—— of foot, supramalleolar, painful stump of, cause, R.S.M. Lect. 19, 20
—— —— —— —— ——, region in leg above, cause of pain in, R.S.M. Lect. 20
—— —— —— —— ——, success of, during the war, R S.M. Lect. 19
—— of thigh, cause of painful nerve troubles after, R.S.M. Lect. 20
—— ——, painful stump, and symptoms of sciatica referred to foot, R.S.M. Lect. 18
—— —— —— —— —— —— —— ——, operation for, R.S.M. Lect. 17, 18
—— stumps below knee, pain in, cured by removal of bony outgrowth from back of tibia, R.S.M. Lect. 17, 18
—— ——, irritation in, set up by unabsorbable ligature material, R.S.M. Lect. 16, 17
—— ——, nerve regeneration in, purposeless, Electr. 51, 52
—— —— of upper arm, with painful nerve-bulbs, R.S.M. Lect. 21

Amputation stumps, pain in, early, R.S.M. Lect. 14
—— ——, painful, cause of, R.S.M. Lect. 6, 7
—— —— ——, from compression, R.S.M. Lect. 10, 14
—— —— —— from involvement of internal saphenous in scar tissue, R.S.M. Lect. 17
—— —— ——, from presence of foreign body or disease in bone, R.S.M. Lect. 15, 16, 17
—— —— ——, from regeneration of nerve-fibres, R.S.M. Lect. 15
—— —— ——, inflammatory, R.S.M. Lect. 14
—— —— ——, internal scar in, R.S.M. Lect. 16
—— —— —— —— ——, upward spread of infective inflammation by, R.S.M. Lect. 16
—— —— —— relief by insertion of gauze seton, R.S.M. Lect. 23
—— —— ——, surgery of (E. M. Corner), R.S.M. Lect. 7-24
—— —— —— ——, need for improvement in, R.S.M. Lect. 24.
—— —— —— ——, precautions necessary, R.S.M. Lect. 22, 23
—— ——, scar tissue of, irritant nature (E. M. Corner), Electr. 49-53
—— —— —— —— ——, producing pain and inflammation, Electr. 50
—— —— —— —— ——, treatment, electrical, Electr. 54, 55
—— —— —— —— —— ——, by X-rays and radium, Electr. 54
—— surgery in civil practice, improvement in, needed, R.S.M. Lect. 10
—— through arm by racquet incision, R.S.M. Lect. 22
—— wounds, treatment of, before healing, Electr. 53
Amputations, application of diathermy in, Electr. 46, 48
—— at the Front, results, R.S.M. Lect. 3
—— below knee, internal saphenous vein causing pain about level of posterior margin of tibia in, R.S.M. Lect. 17
——, routine method of performance before the war, R.S.M. Lect. 8
——, technique of new points in, R.S.M. Lect. 23
——, see also *Uterus*, cervix, amputation at
Anæmia, aplastic, Epid. 150, 157
—— ——, due to T.N.T., summary of fourteen cases, Epid. 158
—— ——, fatal, skilled post-mortem examinations important in, Epid. 157
—— —— in T.N.T. workers, Epid. 157
—— ——, underlying cause of, Epid. 155
—— ——, with unusual blood count, case (J. Porter Parkinson), Child. 55
—— —— —— —— ——, treatment suggested, Child. 57
——, galvanometer deflexions in, Electr. 25, 27
Anaërobic infection of wounds, cause of wide incidence of local tetanus, R.S.M. Discussion 11
—— —— ——, muscle contraction following, R.S.M. Discussion 10
Anæsthesia, administration in treatment of functional aphonia, Laryng. 184, 185
—— by chloroform, physiology of (George A. Buckmaster), Anæsth. 15
——, function of red corpuscles in, Anæsth. 22
——, induction in upright position for plastic face surgery, Anæsth. 9
——, intratracheal, in empyema operations, Anæsth. 7
——, methods of induction for plastic face surgery at home military hospitals, Anæsth. 8, 9
——, soldiers as subjects of, Anæsth. 2
——, surgical, idea of, antiquity, Hist. 65
—— ——, introducer of, Hist. 66, 67
—— ——, literature of, suggested classification, Hist. 68, 69
—— ——, modern, first printed documents relating to, Hist. 65-69
—— under sitting position, Anæsth. 9, 11
Anæsthetic, general, administration during "twilight sleep," Obst. 26, 28, 31, 32, 33
Anæsthetics, administration by nasal tube, Anæsth. 11, 12
—— in home military hospitals, administration (J. F. W. Silk), Anæsth. 1
—— —— —— ——, selection, Anæsth. 3, 4
——, tremor of patients under, Anæsth. 11

Anæsthetists in home military hospitals, equipment, Anæsth. 3
—— —— —— ——, personality, Anæsth. 3
Anæsthetization during operations on nasal septum, method discussed, Laryng. 74
Analgesia during "twilight sleep" in childbirth, Obst. 11, 18, 27, 30, 42
Anatomy, morbid, foundation work in, by Matthew Baillie (R. Fortescue Fox), Hist. 79
Andrewes, F. W., F.R.S.—Muscle contracture following injury, R.S.M. Discussion 14
Andrews, H. Russell.—Discussion on undiagnosed cancer of uterus complicating myoma treated by total hysterectomy, Obst. 57
Angiokeratoma, aberrant type, Derm. 72
——, case (W. Knowsley Sibley), Derm. 101
Animal cells, living, action of chloroform on, Anæsth. 15
Ankle clonus in both limbs, in relation to diagnosis of local tetanus, R.S.M. Discussion 10
Ankylosis, arthroplasty of temporo-mandibular joint for (H. P. Pickerill), Odont. 87
Anopheles superpictus and *maculipennis*, spread of malaria by, in Macedonia, Epid. 16
Anti-ego impulses and ego-ideal, conflict between, Psych. 26
—— ——, energy of, methods of mind for dealing with, Psych. 26
Antithrombin, Child. 43
Antiseptics in fractures of mandible, Odont. 27
Antityphoid inoculation, value of, Epid. 10
Antral cavities, exposure of, in mouth, with total loss of hard palate, case (W. Kelsey Fry and G. S. Hett), Laryng. 90
Antrum, maxillary, and palate, carcinoma of; excision of upper jaw for, followed by diathermy (N. Patterson), Laryng. 34
—— ——, diseases (supposed) of, confusion of dental cysts with, Laryng. 58
—— ——, epithelioma and sarcoma of, malignancy compared, Laryng. 34
—— ——, involvement in fractured maxilla, Odont. 21
—— ——, principal site of origin of choanal polypus, Laryng. 126
—— ——, latent infection of, and paralysis of corresponding sixth nerve in subacute mastoiditis; case illustrating exploration of sinuses by suction surgery (P. Watson-Williams), Otol. 62
—— ——, malignant growth removed from, case (H. Tilley), Laryng. 136
—— ——, sarcoma of (F. A. Rose), Laryng. 36
—— —— ——, radium treatment, Laryng. 36, 37
Anxiety, morbid, forms in which met with, Psych. 33
—— ——, in relation to repressed sexuality, Psych. 33, 34
—— —— —— to war neuroses, Psych. 34
—— ——, pathogenesis, Psych. 33
Anxiety neuroses, examples of, Psych. 4, 5, 9
—— ——, symptoms of, Psych. 19, 20
—— neurosis, apprehensive aspect of, Psych. 33
Aorta, gunshot wound of, double perforating, Path. 111
Aperient treatment of vertigo, Otol. 23
Apex-beat and radial pulse in case of mitral stenosis, with fibrillation of auricle, after cessation of strophanthus tincture, tracings showing, Therap. 27
—— —— —— —— —— —— —— ——, tracings taken before and after massive single dose of digitalis tincture, Therap. 32, 35
—— —— ——, tracings three days after course of digitalis was stopped in case of mitral stenosis with fibrillation of auricle, Therap. 11
—— in case of mitral stenosis with fibrillation of auricle, effect of strophanthus on, tracing showing, Therap. 18
Aphasia, accompanied by mental disorder, average age of male and female patients compared, Neur. 5
—— —— —— ——, cases of, classified, Neur. 6
—— —— —— —— ——, hemiplegia in, Neur. 5
—— —— —— —— ——, percentage of arteriosclerosis, Neur. 5

Aphasia, accompanied by mental disorder, cases of, percentage of family history of insanity, neurosis or alcoholism, in both sexes, Neur. 6
—— —— —— —— —— percentage of heart disease, Neur. 5
—— —— —— —— —— —— of history of alcoholism, Neur. 5
—— —— —— —— —— —— of renal disease, Neur. 5
—— —— —— ——, proper care and treatment of patients, Neur. 4
—— and agraphia co-existing with mental capacity, Neur. 19
——, apraxia and agraphia, association, Neur. 11, 14
——, business or testamentary capacity in, Neur. 4, 6, 14-17
—— —— —— ——, cases illustrating, Neur. 14-17
——, cases of, classification, Neur. 18
——, certain cases in which present, why requiring opinion of alienist, Neur. 3, 4
——, degree of changes of intelligence in, factors influencing, Neur. 4, 5
——, effect upon mental disorder, Neur. 6
——, first symptom indicative of cerebral or mental decay, Neur. 19
——, grave, with slight mental disorder, Neur. 19
—— in relation to mental disease (R. Percy Smith), Neur. 1
——, motor, form of apraxia, Neur. 14
——, slight, accompanied by slight mental disorder, Neur. 6
—— supervening on pre-existing insanity or mental decay, Neur. 19
Aphonia, cases of pulmonary tuberculosis with, Laryng. 164, 165
——, complicating laryngeal tuberculosis in early stage, Laryng. 182, 192
—— —— pulmonary tuberculosis, Laryng. 192, 200
——, due to laryngitis, Laryng. 194, 195
—— following gunshot wounds of larynx, Laryng. 180
——, functional, diagnosis, Larnyg. 182
—— ——. in soldiers, ætiology, Laryng. 180, 183, 188
—— —— ——, condition of vocal cords in, Laryng. 188
—— —— ——, paresis of transversus in, Laryng. 165
—— —— ——, treatment, Laryng. 183-187, 188, 196, 198
—— —— —— —— by anæsthesia, Laryng. 184, 185
—— —— —— —— by physical and breathing exercises, Laryng. 198
—— —— —— ——, moral, Laryng. 183, 187, 188
—— —— —— ——, physical, Laryng. 183
—— —— —— —— ——, method described, Laryng. 183, 184
—— —— paralytic, Laryng. 195
—— —— —— and spastic, appearances of vocal cords in, compared, Laryng. 195, 196
—— ——, so called, myopathic origin, Laryng. 164
—— ——, spastic, Laryng. 195
—— ——, term criticized, Laryng. 192, 194
—— ——, variations in position of vocal cords on attempted phonation, Laryng. 182
——, simulated, Laryng. 194
Apocynamarin, effect in case of mitral stenosis with fibrillation of auricle, Therap. 14, 46
Apocynum, tincture of, and apocynamarin, administration in case of mitral stenosis with fibrillation of auricle, effect of, Therap. 21-25
—— ——, effect in case of mitral stenosis with fibrillation of auricle, Therap. 47
Appendix-clamp, nerve crushing with, R.S.M. Lect. 12
Apperception, loss, under scopolamine-morphine narcosis, Obst. 3
Apraxia, agraphia and aphasia, association, Neur. 11, 14
—— ——, variety of, Neur. 14
—— and agraphia, association without definite hemiplegia, Neur. 12, 14
——, motor aphasia, form of, Neur. 14
Arab labourers, work performance, study of, quoted, Epid. 69, 70
Archer, Alexander, advice of Boerhaave in, case of, Hist. 7
Armenian refugees in Egypt, pellagra among (1917), Epid. 28

Armies, European, rationing systems, Epid. 40, 41
Arms, tumours of, case of, advice of Beerhaave in, Hist. 8
Army, Austro-Hungarian, typhus fever epidemic in, Epid. 32, 33
——, British, dietary, variations in, Epid. 54
—— ——, food-ration in, calorie-allowance, Epid. 56
—— ——, food-waste in, in early stages of the war, Epid. 59
—— —— —— prevention, Epid. 54
—— ——, home-training of, Epid. 59
—— ——, protein ration in, Epid. 41, 54, 55
——, French, protein ration in, Epid. 41
——, German, protein ration in, Epid. 41
——, Italian, at front, bayonet wounds in, Epid. 43
—— —— ——, cholera epidemic in (1915), Epid. 44, 45
—— —— ——, medical school in war zone of, Epid. 53
—— —— ——, rifle wounds in, Epid. 43
—— —— ——, sanitary conditions, Epid. 43
—— —— ——, victims of asphyxiating gas in, Epid. 44
—— —— ——, wounds from artillery fire, percentage, Epid. 43
—— —— ——, wounded in, proportion to total number of fighting troops, Epid. 43
—— —— ——, wounds in, deaths from, Epid. 44
—— ——, food rations in, calorie value, Epid. 55, 56, 57
—— ——, malaria in, prophylaxis against, Epid. 52
—— —— —— —— ——, by quinine administration, Epid. 52
—— ——, protein ration in, Epid. 41, 54, 55
—— —— —— ——, reduction, Epid. 41, 54, 55
—— ——, rationing of, reform in, Epid. 42, 43
—— ——, small-pox, anti-cholera and typhoid-paratyphoid vaccination in, Epid. 48
—— ——, syphilis in, prophylactic measures, Epid. 50
—— ——, tuberculosis in, Epid. 52
—— ——, war museum attached to, Epid. 53
——, Serbian, deported by sea, stamping out pestilence among, Epid. 49, 50
—— ——, lice in, destruction of, Electr. 33-35
Arsenic, administration of collosol iodine or collosol mercury with, ill results following, Otol. 18
—— preparations, extensive use followed by cerebrospinal syphilis, Derm. 80
Arsenical paste, application in treatment of rodent ulcer, Derm. 45, 61, 62
Arteries, gunshot wounds of, Path. 73, 74
—— —— ——, double perforating, Path. 112-114
—— —— ——, incomplete, perforating, Path. 110
—— —— ——, minimal, Path. 74-76
—— —— ——, perforating, absence of disruptive effect, factors accounting for, Path. 116, 117
——, normal, astonishing resistance under extreme distension, example showing, Path. 117
——, retinal, blockage of, causing temporary blindness, Ophth. 5
Arteriosclerosis in cases of aphasia with mental disorder, percentage in both sexes, Neur. 5
——, sthenic dyspepsia leading to, Baln. 4
——, vertigo due to, method of relieving, Otol. 23
Arterio-venous communications due to gunshot injuries, Path. 76, 78
Artery and vein, common iliac left, gunshot wound of, double perforating, Path. 115
—— ——, popliteal, gunshot wound of, Path. 116
——, carotid, external, ligature before diathermy, Electr. 44, 48
——, —— ——, preliminary ligature in operation for cancer of fauces, Laryng. 131
—— ——, left common, gunshot wounds of, double perforating, Path. 112-114
——, femoral, gunshot wound of, single perforating, Path. 113
—— ——, internal scar of amputation stump spreading around, and causing inflammation, R.S.M. Lect. 17

Artery, femoral, vein and saphenous nerve, excision of distal segments, in relief of painful stump in amputation of thigh, R.S.M. Lect. 19
——, popliteal, gunshot wound of, double perforating, Path. 113
Arthritis, rheumatoid, treated by irrigation of periodontal membrane, case (E. Sturridge), Odont. 112
Arthroplasty of temporo-mandibular joint for ankylosis (H. P. Pickerill), Odont. 87
—— —— —— —— ——, results, Odont. 89
—— —— —— ——, why preferable to Esmarch's operations, Odont. 89
Artillery wounds in Italian Army at Front, Epid. 43
—— —— in Russo-Japanese War, Epid. 43
Arytænoid cartilage, hyper-adduction of, case (L. H. Pegler), Laryng. 12
——, left, overlapping right, on vocalization, Laryng. 12, 13
Arytænoideus, paralysis of, case (H. J. Banks-Davis), Laryng. 163
Arytænoids, crossing of (W. Douglas Harmer), Laryng. 171
Ascaris megalocephala, ova of, vulnerability to beta and gamma rays, in dividing stage of nucleus, Path. 7, 16
Asphyxia, avoidance, in administration of anæsthetics in cases of shock and sepsis, Anæsth. 6
——, white, of children born during twilight sleep, Obst. 13, 24, 25, 26
Asthma, humoral, and deafness, case of, advice of Boerhaave in, Hist. 5
Asylum dysentery, Epid. 77
Ataxy, locomotor, in lesions of sensory cortex, Neur. 23
Atropine, action, compared with that of scopolamine, Obst. 2
——, preliminary administration before chloroform, risk of, Anæsth. 12
Auricle and mastoid region, cancer of, treatment by diathermy, Electr. 46
——, recurrent herpes of, in boy, aged 9 (H. J. Banks-Davis), Otol. 53
——, dermatitis herpetiformis of, Otol. 54
—— (cardiac), fibrillation of, changes in clinical features of mitral stenosis after (A. J. Whiting), Therap. 1-52
—— —— ——, effects of digitalis in mitral stenosis after onset of, compared with effect in prefibrillation stage, Therap. 10
—— —— ——, heart failure of, comparative value of digitalis series of remedies in (A. J. Whiting), Therap. 1-52
Austrian prisoners, deported by sea with Serbian Army, stamping out pestilence among, Epid. 49, 50
Aviators, nasal obstruction in, effect on equilibration, Otol. 2.
AYMARD, J. L.—Rhinoplastic case, Laryng. 98

Babinski, theories of reflex contracture of muscle, quoted, R.S.M. Discussion 18
Back, tumour formed on, clinical history, Path. 27
BACOT, A. W.—Discussion on theory of epidemiology in relation to plague, Epid. 129
Bacteræmia, aural, and lateral sinus thrombosis, diagnosis between, Otol. 49, 50
—— —— and pyæmia, diagnosis between, Otol. 50
—— —— and septicæmia, diagnosis between, Otol. 51
—— ——, blood cultures in, Otol. 50
—— ——, diagnosis from lateral sinus thrombosis due to acute mastoid suppuration, Otol. 51
—— ——, term criticized, Otol. 50
—— ——, treatment by inoculations, Otol. 52
—— ——, with illustrative cases (Richard Lake), Otol. 47
Bacteria, enumeration by drop-measuring method, M.B.L. 4
——, various types, cause of dysentery outbreaks, Epid. 5
Bacteriological examination of discharges from nose in cases of deafness, Otol. 40
BADCOCK, J. H.—Discussion on treatment of mandibular fractures, Odont. 48
——, President's address on jaw injuries, Odont. 1
BADGEROW, GEORGE.—Case for diagnosis, Laryng. 24

Bagdad sore, Epid. 24; see also *Leishmania*
Baillie, Matthew, post-mortem reports of (1813-21), Hist. 79
Baines, Arthur E.—The interpretation of certain electro-physiological phenomena, Electr. 23
Ballance, Sir C. A., and Edmunds, W., outside diameter of adult aorta, quoted, Path. 116
Bankart, A. S. Blundell.—Congenital malformation of the left temporo-maxillary joint and both hip-joints, Child. 16
——, discussion on treatment of three cases of melæna neonatorum, Child. 8
——, note on case of trophic ulceration of foot after gunshot wound, quoted, Derm. 47
Banks-Davis, H. J.—Acute mastoiditis in a boy, aged 8; spontaneous recovery, Otol. 54
——, boy, aged 11, with a cystic swelling occluding the right cartilaginous meatus; ? dermoid cyst, Otol. 6
——, case of trichotillomania with delusions of nasal origin, Laryng. 166
——, depressed scar following mastoid operation, Otol. 56
——, discussion on actinomyces in crypt of tonsil, Laryng. 162
—— —— on case for diagnosis, Laryng. 171
—— —— —— of carcinoma of fauces, treated by per-oral excision, followed by diathermy, Laryng. 132
—— —— —— of extradural abscess perforating skull, Otol. 60
—— —— —— of foreign body (collar stud) in left bronchus, Laryng. 72
—— —— —— of hyper-adduction of left arytænoid cartilage, Laryng. 12
—— —— —— of orchitis and deafness, Otol. 81
—— —— on dental cysts involving nose, Laryng. 160
—— —— on foreign body impacted in trachea, Laryng. 129
—— —— on gastro-intestinal sepsis as cause of Ménière's symptoms, Otol. 19, 23
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 44
—— —— on lupoid tuberculosis, Laryng. 5
—— —— on operation on mastoid for acute suppurative inflammation followed by insertion of B.I.P., Otol. 70
—— —— on removal of epithelioma of larynx, Laryng. 153
—— —— on saddle-back nose consequent on resection of septum, Laryng. 21
——, double perforation of the septum nasi with peculiar appearance of soft palate, in a man aged 46, Laryng. 167
——, foreign body, a green pea, removed from middle ear by post-aural operation on a boy, aged 10, Otol. 7
——, paralysis of the arytænoideus in a woman, aged 24, Laryng. 163
——. parotid fistula of twelve months' duration in a man, aged 50, Otol. 55
——, President's address, Otol. 1
——, recurrent herpes of auricle in a boy, aged 9, Otol. 53
——, (?) thyro-lingual cyst in a girl, aged 20, Laryng. 167
Bardsley, P. C.—Discussion on direct observation of fundus oculi during period of temporary blindness, Ophth. 5
——, new form of bi-focal for myopes, Ophth. 16
Bardswell, N. D.—Discussion on cases of tuberculosis of larynx, Laryng. 17
Barley, calorie values in diet at Millbank Penitentiary, Epid. 78, 79, 80
Barlow, Sir Thomas, Bt., K.C.V.O., suggestion of appointment of dentists in T.N.T. shell-filling factories, Epid. 156
Barnes, Henry.—On consultations with Boerhaave (extracts from the note-book of a Carlisle physician), Hist. 1-9
Barnes, Stanley.—Discussion on treatment of injury to peripheral nerves, Electr. 33
Barrett, Lady.—Discussion on scopolamine-morphine narcosis in childbirth, Obst. 42
Barton, J. Kingston.—Discussion on gastro-intestinal sepsis as cause of Ménière's symptoms, Otol. 21
Bary, L., treatment of psoriasis by, quoted, Derm. 49, 50
Bathing, fresh-water, inhibition, in prophylaxis of bilharzia, Epid. 24
Baths in treatment of functional nervous disorders in soldiers, Neur. 18

BATTEN, F. E.—Muscle contracture following injury, R.S.M. Discussion 11
——, suggested seat of anatomical lesion in cases of cerebral diplegia, Neur. 26
BATTEN, G. B.—Discussion on convenient method of heating spiral of Coolidge tube, Electr. 22
——, discussion on surgical diathermy, Electr. 46
——, on treatment of injury to peripheral nerves, Electr. 35
Battle-dreams, diagnostic value, Psych. 18, 19
—— in relation to regression, Psych. 18, 19
BAYLISS, W. M., F.R.S.—Discussion on electro-physiological phenomena, Electr. 27
Bayonet practice, tuition in inflicting injuries a means of arousing suppressed impulses to cruelty, Psych. 27
—— wounds in Italian army at front, Epid. 43
Beato Angelico, portrait of St. Cosmas and St. Damian by, Hist. 70, 73
BEDDOES, T. P.—Discussion on hæmophilia with effusion into knee-joints, Child. 32
Bede, Venerable, on St. Cosmas and St. Damian, quoted, Hist. 75
Belgaum, plague epidemics (1897-1904), correlation between β_2 and total number of deaths, Epid. 110
—— —— ——, values of β_1 and β_2 (symmetry and asymmetry and form of curves) for, Epid. 92, 93
Belgian hand workers, nutrition of, data as to, Epid. 67
Benedict, metabolism of fasting individual, Epid. 64
BENNETT, F. J.—The after-death destruction of teeth and bones by mould fungus, Odont. 93-100
Benzine, spraying with, destruction of lice by, Epid. 36
Beri-beri in Gallipoli Peninsula, Epid. 26
—— in Mesopotamia among British troops, Epid. 26
BERKELEY, COMYNS.—Discussion on scopolamine-morphine narcosis in childbirth, Obst. 43
BERRY, JAMES.—Discussion on pandemic of typhus in Serbia in 1914-15, Epid. 38
BERRY, Dr. MAY DICKINSON.—Discussion on pandemic in Serbia in 1914-15, Epid. 39
Bert, Paul, lethal effect of chloroform on dogs, Anæsth. 15, 16
BETENSON, W. D.—Discussion on theory of epidemiology in relation to plague, Epid. 131
Bettongia (kangaroo rat), bulbous endings in tubes in enamel of, Odont. 53
Bibliographies and references:—
    Actinomycosis of the tonsil, Laryng. 162 (*footnotes*)
    Acladiosis, Derm. 18
    Chloroform, physiology of anæsthesia by, Anæsth. 26
    Counting chamber (new) for enumeration of protozoa and other organisms, M.B.L. 1
    Dentures impacted in air passages, Odont. 109 (*footnotes*)
    Food problem, Epid. 84
    Keratosis, punctate, Derm. 89
    Muscular hypotonia and changes in nutrition, Neur. 37
    Teeth aspirated into air passages, Odont. 109 (*footnotes*)
    Tuberculosis, industrial, incidence of, Epid. 141
    Tubular enamel of marsupials, Odont. 64
di Bicci, Lorenzo, portrait of St. Cosmas and St. Damian by, Hist. 70, 71
Bi-focal, new form of, for myopes (P. C. Bardsley), Ophth. 16
Bigelow, H. J., account of ether anæsthesia by, Hist. 66, 68
Bile-ducts, congenital, obliteration of (W. E. Carnegie Dickson), Child. 27
—— ——, proliferative changes in coccidiosis, Path. 17
Bilharzia in Egypt, Epid. 23
——, occurrence of, in Eastern campaigns, Epid. 23
——, parasite of, intermediate hosts, Epid. 23
——, prophylaxis against, Epid. 24
—— —— ——, by destruction of parasite, Epid. 24
—— —— ——, by inhibition of fresh-water bathing, Epid. 24

Bird beak type of nasal deformity, nasal obstruction in, Laryng. 107, 108
—— —— —— —— ——, treatment, Laryng. 107
Births, spontaneous physiological, narcotic for, requirements, Obst. 4
Bismuth, iodoform and liquid paraffin (B.I.P.), insertion after operation on mastoid for acute suppurative inflammation (H. Tilley), Otol. 69
—— —— —— —— —— —— —— —— —— ——, caution in application, Otol. 74
—— —— —— —— —— —— —— —— —— ——, objections to, Otol. 72, 73
—— —— —— —— —— —— —— —— —— ——, recommended, Otol. 71
—— poisoning, symptoms of, following application of Morison's paste, Otol. 3
Black, Ernest, "boomerang" leg, Path. 35
BLACKER, G. F.—Discussion on scopolamine-morphine narcosis in childbirth, Obst. 43
Bladder, automatic, in case of destruction of spinal roots and termination of spinal cord from shell wound, Neur. 28
——, gunshot injuries, disruptive phenomena following, Path. 104, 105
—— —— injury of, with complete longitudinal rent of anterior wall, Path. 105, 106
—— —— wound of, minimal, Path. 78
——, missiles resting in, forming nuclei of phosphatic calculi, Path. 107
——, papillomata, treatment by diathermy, Electr. 46
Bleeding, arrest by application of coagulose, Child. 8, 9
Blepharospasm, hysterical disorder of vision in, Ophth. 13
Blindness, temporary, direct observations of fundus oculi during period of (A. W. Ormond), Ophth. 5
—— ——, from blockage of retinal arteries, Ophth. 5, 6
BLOMFIELD, J.—Discussion on administration of anæsthetics in home military hospitals, Anæsth. 10
Blood, absorption of oxygen by, Anæsth. 25
——, abstraction of chloroform from, Anæsth. 18
——, assumption of chloroform by, rate of, Anæsth. 20
——, average amount of chloroform per 100 grammes of, Anæsth. 23
——, chloroform difficult to recover from, Anæsth. 17
—— —— in, amount of, method of determining, Anæsth. 19
—— —— ——, anæsthetic and lethal quantities, Anæsth. 19, 20
Blood-clot dressing, Holmes's, application after mastoid operations, Otol.
—— coagulation, factors essential to, Child. 43
—— —— in purpura and hæmophilia (W. P. Lucas), Child. 42
—— corpuscles, enumeration by drop-measuring method, M.B.L. 4
—— ——, red, carriers for oxygen and carriers of chloroform vapour, Anæsth. 26
—— —— ——, change in form of, Anæsth. 23
—— —— ——, chief vehicle in transport of chloroform from lungs, Anæsth. 22
—— —— ——, functions of, in anæsthesia, Anæsth. 22
—— count, unusual, in case of aplastic anæmia (J. Porter Parkinson), Child. 55
—— cultures in aural bacteræmia, Otol. 50
Blood, effects of T.N.T. poisoning on, Epid. 157, 158, 164, 165
——, elimination of chloroform from, after anæsthesia, rate of, Anæsth. 21
——, examination of, in case of lupoid tuberculosis of pharynx, Laryng. 40
——, exhalation of chloroform from, Anæsth. 18
Blood-gas pump, special form of, used in determination of composition of blood gases in anæsthesia, Anæsth. 23
—— gases, analyses during chloroform anæsthesia, results, Anæsth. 16
—— —— —— —— —— ——, results, Anæsth. 16
—— ——, composition of, in chloroform anæsthesia, Anæsth. 23
Blood, *Microfilaria nocturna* in, enumeration method, M.B.L. 5
——, normal of cat, composition compared with that of other animals in different stages of anæsthesia, Anæsth. 24
—— of chloroformed dogs, carbon monoxide in, how arising, Anæsth. 18

Blood of patients dying under influence of chloroform, observations on, Anæsth. 27

——, oxygen and carbon dioxide in, amounts taken up by chloroform, Anæsth. 17

—— —— content in chloroform narcosis, on what dependent, Anæsth. 26

—— —— ——, fall in chloroform anæsthesia, Anæsth. 24, 25

Blood-pressure, high and low, in cases of vertigo, respective treatment, Otol. 20

——, high, common cause of dilatation of heart, Otol. 16

—— ——, in gastro-intestinal sepsis, Otol. 16

—— ——, reduction of, Otol. 17

—— in cases of tinnitus, Otol. 24

——, low, as cause of Ménière's symptoms, Otol. 19

Blood-spaces in malignant endotheliomata, Path. 25

—— —— ——, process of invasion by blood, Path. 25, 26

Blood-stream, effect of heliotherapy on, Electr. 11

Blood-transfusion in purpura, reason for preference of whole blood in, Child. 43

Blood-vessels, avoidance of injury during diathermy, Electr. 40, 48

—— containing malignant emboli, vacuolation in, Path. 25

——, inflammation of, set up by ascending irritation from scar tissue, Electr. 52

——, new, method of formation, Path. 24, 25

—— of septal cartilage, Laryng. 98

——, transmission of inflammation along, by internal scar of painful amputation stumps, R.S.M. Lect. 16, 17

Blood, whole (blood serum), injection of, in successful treatment of melæna neonatorum, three cases (Robert Hutchison), Child. 7

Bochdalek, researches on foramen cæcum, quoted, Hist. 49

Body mass and energy intake, correlation between, Epid. 68

——, posture of, automatic, unconscious adjustment of, Neur. 32

—— ——, effect of muscular hypotonia following lesion of posterior part of spinal cord on, Neur. 34, 35

Boerhaave, advice of, in case of Alexander Archer, Hist. 7

—— —— —— of cancer of breast, Hist. 3

—— —— —— of cirrhosis of liver, Hist. 2

—— —— —— of deafness and humoral asthma, Hist. 5

—— —— —— of difficult labour, Hist. 6

—— —— —— of lepra, Hist. 4

—— —— —— of Lord Downs, Hist. 6

—— —— —— of Lord Lancoborough, Hist. 6

—— —— —— of morbus calculosus, Hist. 5

—— —— —— of paralysis, Hist. 3

—— —— —— of scorbutus, Hist. 7

—— —— —— of tumour of maxillary gland, Hist. 8

—— —— —— of tumour of arms, Hist. 8

——, audience of, at lectures, international character, Hist. 13

——, British pupils of, Hist. 15

——, consultations with, by Dr. George Carlyle, Hist. 2

——, influence on medical education of Europe, Hist. 15

——, letters of, to Cox Macro (D'Arcy Power), Hist. 21

——, remedies recommended by, Hist. 9

——, two lecture-lists of (E. C. van Leersum), Hist. 11-20

Bombay, districts of, plague epidemics, values of β_1 and β_2 for black rat, brown rat, and man, Epid. 95, 96, 97, 112

——. greater incidence of plague among brown rats in, Epid. 94, 97

——, plague epidemics and epizootics (1907-11), correlations between number of deaths in man and number of deaths among black and brown rats during fortnight preceding, Epid. 111

—— —— —— (1908-11), values of β_1 and β_2 and date of mean of epidemic for black and brown rat and man, Epid. 97, 112

Bombay, plague epidemics (1898-1913), correlation between β_2 and total number of deaths, Epid. 110
—— —— ——, change of date of mean in, Epid. 100, 101
—— —— ——, values of β_1 and β_2 (symmetry and asymmetry and form of curves) for, Epid. 92, 93
—— —— epizootic in rats in, seasonal incidence, Epid. 94
——, preponderance of black rats over brown in, Epid. 93, 94, 97
Bond, J. W.—Discussion on removal of epithelioma of larynx, Laryng. 153
Bone and air conduction, relative, in tuning-fork tests, Otol. 5
——, atrophic and inflammatory changes in, following nerve irritation, R.S.M. Lect. 17
——, avoidance of injury during diathermy, Electr. 40
—— conduction, absolute, in tuning-fork tests, Otol. 5
——, disease in, causing pain in amputation stumps, R.S.M. Lect. 15, 17
—— fragments in fractures of mandible, preservation, Odont. 29
—— graft, free, transplantation in promotion of union in ununited fractures of mandible, Odont. 43-46
—— —— —— —— —— —— —— —— ——, difficulties of, and complications following, Odont. 44
—— —— —— —— —— —— —— —— ——, means of fixation, Odont. 44, 48
—— —— —— —— —— —— —— —— ——, method of application, Odont. 44
—— —— from tibia, how obtained, Odont. 45
—— —— pedicled, method of application in ununited fractures of mandible with considerable loss of tissue, Odont. 42
Bone grafting in fractured jaws, Odont. 16, 17, 40-46
—— —— in war injuries of jaw, Odont. 23
——, loss of, in fractures of mandible, Odont. 28
—— marrow, effects of T.N.T. poisoning on, Epid. 153, 165
—— ——, red, deficiency in reactive power of, Child. 57
—— or cartilage, implantation, in treatment of saddle-back nose, Laryng. 21
——, sutures through, in combination with splints, for immobilization of extensive fractures of lower jaw (V. H. Kazanjian), Odont. 67
Bones, after-death destruction by mould fungus (F. J. Bennett), Odont. 93-100
——, flattening of, in osteomalacia sclerotica, Path. 40
——, long, sclerosing panosteitis of, preceded by softening and plasticity (osteomalacia sclerotica), Path. 35
Bookbinders, pulmonary tuberculosis in, mortality rates, ages 35-45 (1900-1902) Epid. 144
"Boomerang" bones and leg, see *Osteomalacia sclerotica*
Boracic lotion in tinnitus of osteosclerosis, Otol. 24
Borrmann, innocent tumours forming metastases, quoted, Path. 29
Botany Bay, convicts on passage to (1802), diets of, Epid. 81
"Botulism," discussion on (H. Morley Fletcher), Child. 51, 53; (J. Porter Parkinson), Child. 52, 53: (J. D. Rolleston), Child. 52, 53
—— suggested diagnosis of polio-encephalitis in cases of, Child. 52, 53
Bowen's disease, see *Dermatosis*, pre-cancerous
Bower, W., prognosis of toxic jaundice, quoted, Epid. 162
Bowlby, Sir A. A., K.C.M.G., K.C.V.O.—The early treatment of wounds at the Front, with special regard to primary suture (abstract), R.S.M. Lect. 1-4
——, muscle contracture following injury, R.S.M. Discussion 19
Boyle, H. E. G.—Discussion on administration of anæsthetics in home military hospitals. Anæsth. 11
——, nitrous oxide-oxygen-ether outfit, Anæsth. 30
Brain, abscess of, exploration by diathermy, Electr. 44
—— ——, hernia cerebri, avulsion of abscess wall, complete homolateral ophthalmoplegia, recovery (W. M. Mollison), Otol. 61
——, cortex of, sensory, lesions of, ataxy in, Neur. 23

Brain, cortex of, sensory, lesions of, disturbances of tactile sensation in, Neur. 23
—— —— —— ——, hyperthermia and hypothermia in, Neur. 23
—— —— —— ——, loss of muscular tone in, Neur. 24
—— —— —— —— —— of sense of posture and appreciation of measured movements in, Neur. 23
—— —— —— ——, muscular atrophy and other changes in nutrition associated with (Leonard Guthrie), Neur. 21
—— —— —— —— —— —— —— —— —— —— ——, ætiology discussed, Neur. 24-26
—— —— —— ——, sensory affections in, Neur. 23
—— —— —— ——, tendon jerks in, Neur. 24
—— —— —— ——, topognosis and compass test reactions defective in, Neur. 23
—— —— —— ——, impairment of stereognostic sense, and estimation of weight in, Neur. 23, 24
—— —— —— ——, variability in, Neur. 24
—— —— —— ——, vasomotor affections in, Neur. 23
—— —— ——, trophic functions, question of and evidence for, Neur. 25, 26
——, diseases, congenital, Neur. 25
—— from patient who presented nystagmoid movements in pharynx and larynx (A. Brown Kelly), Laryng. 141
——, hemispheres, ablation in dog, results, Neur. 31
——, situation in, of controlling centres underlying reflexes system of postural tonus, Neur. 31
——, tuberous sclerosis of, Derm. 26
Bread, calorie values in dietary at Millbank Penitentiary, Epid. 78, 79, 80
Breast, cancer of, case of, advice of Boerhaave in, Hist. 3
Breinl, A., and Priestley, H., boomerang leg, Path. 36
Brewers, pulmonary tuberculosis in, mortality rates, ages 35-45 (1900-1902), Epid. 145
Bristowe, W. R.—Discussion on treatment of injury to peripheral nerves, Electr. 31
British indebtedness to Dutch universities, Hist. 15
—— pupils of Boerhaave, Hist. 15
—— troops in Egypt, relapsing fever among, Epid. 21
—— —— in Mesopotamia, beri-beri among, Epid. 26
—— ——, see also *Army*, British
Bromide eruption case (W. Knowsley Sibley), Derm. 32
Bronchitis and acute membranous tracheitis, death from, five weeks after operation (suspension method), for removal of multiple papillomata of larynx (H. Tod), Laryng. 68
——, deaths from, during siege of Paris, Epid. 75
Bronchoscopy and screen examination combined, in dilatation of œsophagus from cardiospasm, Laryng. 53
—— —— —— ——, Tilley's method, Laryng. 53
——, per-oral, removal of teeth from air passages under, Odont. 110
——, proportion of cases of aspiration of teeth into air passages before and after introduction of, Odont. 110
——, lower, and tracheotomy, in removal of tooth impacted in secondary bronchus of left lung after two unsuccessful attempts by upper bronchoscopy (Sir StClair Thomson), Odont. 100-111
Bronchus, impaction of tooth in, cases reported, Odont. 105
—— —— ——, medico-legal aspect, Odont. 107
—— —— ——, precautionary measures upon occurrence or when suspected, Odont. 106
——, secondary, of left lung, tooth impacted in, development of lung abscess, Odont. 103
—— —— —— —— —— ——, removal by tracheotomy and lower bronchoscopy, after two unsuccessful attempts by upper bronchoscopy (Sir StClair Thomson), Odont. 100-111
——, left, foreign body (collar stud) in, producing collapse of lung of one year's duration (J. Dundas Grant), Laryng. 71

Brownlee, John.—Certain aspects of the theory of epidemiology in special relation to plague, Epid. 85-132

——, discussion on incidence of industrial tuberculosis, Epid. 147

Bruce, Sir David, K.C.B.—Muscle contracture following injury, R.S.M. Discussion 20

Brühn-Lindemann needle extension for fixing edentulous portions of fractured mandible (W. H. Dolamore), Odont. 66

Brydone, J. M.—Discussion on scopolamine-morphine narcosis in childbirth, Obst. 41

Bubb, C. H.—Some principles involved in the treatment of mandibular fractures, Odont. 27-37

Bubo, ulcerating, ulcus molle serpiginosum starting from, Derm. 22, 23

Buchanan, G. S., C.B. Discussion on pandemic of typhus in Serbia in 1914, 1915, Epid. 37

——, discussion on problems of Italian Medical War Service, Epid. 54

——, epidemics of the Eastern Campaigns, Epid. 1-30

Buckmaster, George A.—Some considerations on the physiology of anæsthesia by chloroform, Anæsth. 15

—— and Gardner, J. A., analyses of blood gases during chloroform anæsthesia, quoted, Anæsth. 16

Bullet causing gutter wound of liver, Path. 60

——, grazing of liver by, Path. 59

—— wound of liver causing detachment of portions of organ, Path. 59

—— —— of spleen and stomach, results, Path. 91

—— wounds of liver causing fissured perforations, stellate and linear, Path. 52-54, 57

—— —— ——, increased damage due to, fracture of overlying ribs, Path. 62

—— —— of viscera, shape of resulting fissures, Path. 51

—— ——, stenosis of trachea due to, treatment, Laryng. 187

Bullets, British, German and French, lengths compared, Path. 116

Bunch, J. L.—Agminated molluscum contagiosum, Child. 44

——, case of lupus mutilans, Derm. 61

——, discussion on case for diagnosis, Derm. 84

—— —— —— of acute generalized lichen planus treated by lumbar puncture, Derm. 81

——, erythema elevatum diutinum, Derm. 29

——, syphilitic rash first appearing after twenty-three injections of novarsenobillon, Derm. 78

——, vitiligo patches with central pigmented mole, Child. 17

Burke, Noel H. M.—Discussion on electrical treatment of war wounds and scar tissue, Electr. 54

——, treatment of cases with injury to peripheral nerves, Electr. 29

Burnside, E. E.—(1) A portable "snook" apparatus; (2) a transformer for heating current of the Coolidge tube, Electr. 58

Business capacity in aphasia, Neur. 4, 6

—— —— ——, cases illustrating, Neur. 14-17

Butlin, Sir H., failures in repair of nose by paraffin injection, quoted, Laryng. 136

——, operation for thyroid tumour at base of tongue, Laryng. 155

——, prognosis of malignant disease of nose, quoted, Laryng. 33

Cabinet-makers, pulmonary tuberculosis in, mortality rates, ages 35-45 (1900-1902), Epid. 144

Calcifying substances in living body, periodicity of deposit, Odont. 63

Calcospherites, presence in human and marsupial enamel, Odont. 62

Calculi, phosphatic, missiles resting in urinary bladder forming nuclei of, Path. 107

Calculous disease, case of, advice of Boerhaave in, Hist. 5

Calculus of tonsil (C. H. Hayton), Laryng. 113

—— ——, nucleus of, Laryng. 113

—— ——, rarity, Laryng. 113

——, salivary (Irwin Moore), Laryng. 81

—— ——, mistaken for malignant disease, Laryng. 82

——, submaxillary, large (Dan McKenzie), Laryng. 156

Calcutta, plague epidemics (1901-09), correlation between β_2 and total number of deaths, Epid. 110

—— —— ——, values of β_1 and β_2 (symmetry and asymmetry and form of curves) for, Epid. 92, 93

Calkins, enumeration of ciliate protozoa, quoted, M.B.L. 2

Calorie allowance in food ration in British army, Epid. 56

—— value of diet, increase according to amount of energy-output, Epid. 56, 57

—— —— —— of sedentary workers, Epid. 55, 57

—— —— of fat, Epid. 62

—— —— of food rations in Italian army, Epid. 55, 56, 57

—— —— of protein, Epid. 62

—— values of diet at Millbank Penitentiary, Epid. 78, 79

Calories, amount required for performance of moderate work, Epid. 69, 70

—— in diet, number required by industrial workers, Epid. 82

——, total store of, in fat in body, Epid. 65

Cambridge University scheme for education in radiology and electro-therapeutics, Electr. 6

Cameron, H. C.—Cases of cretinism, Child. 20

——, case of erythromelalgia, Child. 25

—— —— of osteomalacia and infantilism, with horseshoe kidney and interstitial nephritis, Child. 22

—— —— of osteomalacia and infantilism, with renal deficiency, Child. 23

——, discussion on case of osteogenesis imperfecta, Child. 42

—— —— on coagulation of blood in purpura and hæmophilia, Child. 43

—— and Trethowan, W. H.—Case for diagnosis, Child. 45

Campbell, Harry.—Discussion on case for diagnosis, Child. 19

Camphorated oil as preventive against lice, Epid. 35

Cancer of auricle and mastoid region, treatment by diathermy, Electr. 46

—— of breast, case of, advice of Boerhaave in, Hist. 3

—— of fauces treated by per-oral excision, followed by diathermy (W. Hill and N. Patterson), Laryng. 130

—— of larynx, extrinsic, four years after operation through side of neck (Sir StClair Thomson), Laryng. 127

—— ——, intrinsic, laryngo-fissure and semi-demi-laryngectomy, one year after operation (Sir StClair Thomson), Laryng. 126

—— of pharynx, treatment by diathermy, Electr. 43, 46, 47

—— of soft palate, treatment by diathermy, Electr. 48

—— of tongue, treatment by diathermy, Electr. 44

—— —— —— ——, results, Electr. 42

—— of tonsil, treatment by diathermy, Electr. 43, 45

—— of uterus-cervix, treatment by diathermy, Electr. 45, 48

——, undiagnosed, of body of uterus complicating myoma, treated by total abdominal hysterectomy (H. R. Spencer), Obst. 48

——, wrong diagnosis of, frequency, Laryng. 14

Cannon, W. B., rhythmic segmentation of small intestine, Path. 103

Cap splints in fractures of mandible, Odont. 19, 25, 26

Cape Helles, sandfly fever at, Epid. 22

Capillary system of endothelioma on back of child, Path. 30, 31

Caps, dirty, folliculitis in soldiers from wearing, Derm. 52, 53

Carbohydrate, substitution for protein in diet, Epid. 63

——, under what conditions a better source of energy than protein, Epid. 63

Carbohydrates, daily amount consumed by various groups of industrial workers, Epid. 70

—— in diet, amount of protein in proportion to, Epid. 40, 41, 60

—— stored in body, Epid. 58

Carbolic acid, liquefied, application in vascular or telangiectatic adenoma sebaceum (Pringle type) Derm. 25

Carbon dioxide in blood, amount taken up by chloroform, Anæsth. 17

—— —— in treatment of nævus, Electr. 46, 48

—— —— —— of vascular or telangiectatic adenoma sebaceum (Pringle type) Derm. 25

—— —— snow in treatment of senile malignant degeneration of skin, Derm. 45

—— monoxide in blood of chloroformed dogs, how arising, Anæsth. 18

Carcinoma, experimental production of, attempted by means of radium (W. S. Lazarus-Barlow), Path. 1

—— —— —— —— —— ——, results discussed, Path. 15

—— of antrum and palate; excision of upper jaw for, followed by diathermy (Norman Patterson), Laryng. 34

——, pedunculated, of pharynx (specimen and slide) (A. Brown Kelly), Laryng. 123

——, primary, of nasopharynx (Irwin Moore), Laryng. 1

—— —— ——, treatment by injection of colloidal copper, Laryng. 1

——, squamous-cell, epithelial downgrowths in skin of rats inoculated with radium showing appearances similar to "cell nests" of, Path, 4, 5, 6, 14, 16. 17

Carcinomatous tissues, human, amount of radium contained in, Path. 1

Cardamoms, compound tincture of, combined with tincture of strophanthus, administration in case of mitral stenosis with fibrillation of auricle, Therap. 28, 30

Cardiospasm, dilatation of œsophagus from, Laryng. 53

Cardio-vascular system, shifting of missiles within, Path. 77

CARGILL, L. V.—Discussion on direct observation of fundus oculi during period of temporary blindness, Ophth. 6

Carius, method of determining amount of chloroform in blood, Anæsth. 19

Carlyle, George, extracts from note-book of, reporting cases in which Boerhaave was consulted, Hist. 2

Carpentry, value of, in re-education of soldiers, Neur. 48

Carrel-Dakin treatment in septic amputation cases, R.S.M. Lect. 23

Carter, J. Thornton, "Cytomorphosis of the Marsupial-enamel Organ," quoted and discussed, Odont. 49-65

Cartilage, embedding under skin, at time of rib operation, Laryng. 88

—— —— —— ——, in treatment of pug nose type of injury, Laryng. 88

—— graft (autogenous costal), employment of, for septal support in case of sunken-in nose (G. S. Hett), Laryng. 96

—— ——, homologous, in treatment of post-traumatic laryngeal stenosis, case (G. S. Hett), Laryng. 97

—— grafts, septal, autogenous compared with heterogeneous, Laryng. 109

——, implantation in rhinoplasty, Laryng. 102

—— —— in treatment of fracture of superior maxilla, Laryng. 88

——, transplantation of, into septum (J. F. O'Malley), Laryng. 139

CASTELLANI, ALDO.—"Accladiosis," Derm. 12

Cat, local tetanus in, R.S.M. Discussion 6, 9

——, normal blood of, composition compared with that of other animals in different stages of anæsthesia, Anæsth. 24

Cats and dogs, respective quantity of chloroform required to produce anæsthesia in, Anæsth. 20

——, experiments on, determining anæsthetic and lethal quantities of chloroform in narcosis, Anæsth. 19

—— —— —— —— —— —— —— ——, position of animal under, Anæsth. 19

Cataract, couching for, changes in vitreous resulting from penetrating septic wounds, based on 780 cases of, Ophth. 1, 3

Catarrh, nasal, without deafness, Otol. 30

——, nasopharyngeal, due to gastro-intestinal sepsis, Otol. 16

—— —— ——, method of alleviating, Otol. 17, 18

Catharsis, form of, beneficial action in sufferers from war neuroses, Psych. 13, 14

CATHCART, G. C.—Case for diagnosis, Laryng. 84

——, case of thyrofissure and removal of right cord six years after operation, Laryng. 121

CATHCART, G. C.—Removal of foreign body impacted in the œsophagus, Laryng. 83
Causalgia, Electr. 35
——, treatment unsatisfactory, Electr. 36
Cauterization, nasal, in relief of tinnitus and vertigo in ear lesions, Otol. 31
CAUTLEY, EDMUND.—Discussion on case of congenital heart disease, Child. 39
Cavernous sinus, thrombosis of, due to disease of sphenoidal sinus, Otol. 35
Cell proteins and narcotic substance, adsorption between, Anæsth. 15
Cells, fixed, of vitreous becoming centres of chemotaxis on being poisoned from septic infection, Ophth. 3
Celluloid, employment as support in rhinoplasty not satisfactory, Laryng. 89
Ceratophyllus fasciatus, host of, Epid. 129
—— ——, spread of plague in India by, Epid. 129
Cerebellum, tract of, association of spinal posterior columns with, Neur. 32
——, typical unilateral lesion of, resulting from wound, case, Neur. 28
Cerebral decay, aphasia first symptom of, Neur. 19
Cerebro-spinal fluid, cells of, enumeration by drop-measuring method, M.B.L. 4
Chadnor water, Cheltenham, composition, Baln. 2, 3
—— —— ——, renal affections benefited by, Baln. 5
—— —— ——, rheumatism benefited by, Baln. 6
Chamber, John, probably barber-surgeon, Hist. 57
Chancre, primary syphilitic, of umbilicus, case (George Pernet), Derm. 23
Chapple, H., removal of nerve by epineural sleeve, R.S.M. Lect. 22
Cheek teeth, removal, in war injuries of jaw, Odont. 15, 16, 18
Cheltenham, climate of (R. Kirkland), Baln. 1, 6
—— ——, diseases for which suitable or unsuitable, Baln. 7
——, meteorology of, Baln. 6
——, mineral waters of (R. Kirkland), 1, 2-6
—— —— ——, classification, Baln. 2
—— —— ——, composition, Baln. 2, 3
—— —— —— ——, compared with that of principal spas of Europe, Baln. 2
—— —— ——, maladies suitable for treatment by, Baln. 3
——, topography, Baln. 1, 6
Chemotaxis, fixed cells of vitreous becoming centres of, under septic infection, Ophth. 3
Chick, Miss H., antiscorbutic diet in scurvy, quoted, Epid. 28
Chicken-pox, followed by neuro-retinitis (L. Paton), Ophth. 12
Childbirth, scopolamine-morphine narcosis, "twilight sleep" in, Report of Committee to investigate effects of, Obst. 1; see also *Scopolamine-morphine* narcosis
Children, born under "twilight sleep" in mother, absence of normal respiration in, Obst. 23, 24, 37
—— —— —— —— —— ——, condition of, at birth, Obst. 12, 22, 31, 35
—— —— —— —— —— ——, history of, after birth, Obst. 14
——, chronic fibrosis of kidneys associated with infantilism in, Child. 25
——, nasal obstruction in, Otol. 29
——, size and position of Eustachian tube in, Otol. 29
——, symmetrical nodules of vocal cords in, Laryng. 117, 118
——, with simple nasal stenosis, question of deafness in, Otol. 29
Chin and skull caps, application in fractures of maxilla, Odont. 21
Chittenden, researches on reduction of protein rations, quoted, Epid. 40, 41, 55
Chloroform, absorption by water or sodium chloride solutions, Anæsth. 17
——, abstraction from blood, Anæsth. 18
——, action on living animal and vegetable cells, Anæsth. 15
——, administration by sitting-up method, vomiting under, Anæsth. 12
—— —— in intracranial operations, Anæsth. 7
—— —— in twilight sleep, Obst. 39, 41
—— ——, wrong methods of, Anæsth. 4

Chloroform, amount in blood, method of determining, Anæsth. 19
—— amount of oxygen and carbon dioxide in blood taken up by, Anæsth. 17
—— anæsthesia by, analyses of blood gases during, results, Anæsth. 16
—— ——, carbon monoxide in blood of dogs submitted to, how arising, Anæsth. 18
—— ——, cause of death under, Anæsth. 27, 28
—— ——, composition of blood gases in, Anæsth. 23
—— ——, diminution in oxygen content in blood during, on what dependent, Anæsth. 26
—— ——, effect on growth of kittens, Anæsth. 16
—— ——, failure of respiration under, Anæsth. 27
—— ——, fall in oxygen content of blood in, Anæsth. 24, 25
—— ——, physiology of (George A. Buckmaster), Anæsth. 15
—— ——, ventilation of lung during, Anæsth. 25
—— anæsthetic and lethal quantities of, in narcosis, experiments determining, Anæsth. 19
—— and ether, administration of oxygen with, apparatus for (H. R. Phillips), Anæsth. 13
—— ——, mixed, administration in home military hospitals, Anæsth. 6
—— and hæmoglobin aggregations outside body, Anæsth. 25
—— and oxygen, administration through nasal tube, Anæsth. 11
—— —— in empyema operations, Anæsth. 7
——, assumption by blood, rate of, Anæsth. 20
——, average amount per 100 grm. of blood, Anæsth. 23
——, blood of patients dying under influence of, observations on, Anæsth. 27
——, Committee of British Medical Association (1910), findings as to absorption of oxygen by blood, Anæsth. 25
——, death under, not prevented by preliminary administration of atropine, Anæsth. 12
——, difficult to recover from blood, Anæsth. 17
——, elimination of, from blood after anæsthesia, rate of, Anæsth. 21
——, exhalation from blood, Anæsth. 18
——, fate of, in body, Anæsth. 18
—— in amounts incapable of producing anæsthesia, lethal effect on dogs, Anæsth. 15, 16
—— in blood, anæsthetic and lethal quantities, Anæsth. 19, 20
——, inhalation in low percentage in large quantities, effect on body, Anæsth. 16
——, mode of death by, shown experimentally, Anæsth. 20
——, pure, undiluted, administration of, avoidance in home military hospitals, Anæsth. 4, 11, 12
——, quantity to produce various stages of anæsthesia in cats and dogs compared, Anæsth. 20
——, transport from lungs, chief vehicle for, Anæsth. 22
—— vapour, carriers for, Anæsth. 26
—— —— pressures of, Anæsth. 17
Choana, atresia, congenital, without deafness, Otol. 32
Cholera bacillus, carriers of, detection, Epid. 54
——, epidemic among Mesopotamia Force (1916), Epid. 13, 14
—— —— —— —— ——, prophylactic measures, Epid. 14
—— —— in Italian army at Front (1915), isolation and treatment of patients, Epid. 44, 45
—— —— —— —— —— ——, localization and prevention of diffusion, Epid. 44, 45
—— —— —— —— —— ——, quarantine measures, Epid. 45-48
—— —— —— —— —— ——, rise and decline of, Epid. 49, 51
—— —— —— —— —— ——, trench disinfection, Epid. 45
—— in Eastern campaigns, inoculation against, Epid. 15
—— —— —— ——, slight occurrence of, Epid. 13
——, vaccination against in Italian army, Epid. 48
Cholesteatoma and chronic suppuration of middle ear treated by radical mastoid operation, with retention of cholesteatoma matrix, case (J. Dundas Grant), Otol. 77
—— exposing lateral sinus, case (Somerville Hastings), Otol. 10
Cholesterin crystals in cysts of floor of nose, Laryng. 59
Chorionepitheliomata, atypical, resemblance of cases of tumour derived from endothelium to, Path. 34

Choroid and optic disk, coloboma of (G. Harvey Goldsmith), Ophth. 10
——, extension of inflammation to, in septic infection of vitreous, Ophth. 4
Choroidal scar, old, with fibrous band stretching from it to disk (Malcolm L. Hepburn), Ophth. 8
CHRISTOPHERSON, J. B.—Osteomalacia—"boomerang" bones, corkscrew bones—the so-called "boomerang" leg; sclerosing panosteitis of the long bones preceded by softening and plasticity, and resulting in considerable deformity, Path. 35
Ciliary body, infection of, from injection of eyes of rabbits with tubercle bacillus, Ophth. 1
Cirrhosis of liver, case of, advice of Boerhaave in, Hist. 2
Citelli's forceps for removal of growths from ethmoidal labyrinth, Laryng. 33
Cities, large, best place for study of epidemics, Epid. 89, 90, 131
City of London Lying-in Hospital, report on sixty-five cases of "twilight sleep" in childbirth at Obst 36
Civil life, injuries in, followed by muscle contracture, R.S.M. Discussion 6, 11, 17, 18, 20
Civilization, standards of war an official abrogation of, Psych. 25
CLARKE, S. A.—Discussion on case of circinate erythema, Derm. 3
Clavicle, amputation at, section of nerve bulb showing inflammatory nodule, R.S.M. Lect. 10
Clayton, statistics of foreign bodies aspirated into lungs, Odont. 109
Clergymen, pulmonary tuberculosis in, incidence, Epid. 145
Climate, conditions of, in relation to plague epidemics, Epid. 128
—— of Cheltenham, Baln. 6
Clover's inhaler in administration of ether in home military hospitals, Anæsth. 5, 6
Closed-bite position of splint in fractures of mandible contrasted with open-bite position, Odont. 34-36
Clothing of Serbian soldiers, destruction of lice in, Epid. 34, 35
Coagulose, application of, value in bleeding, hæmophilia, and melæna neonatorum, Child. 8, 9
Coal miners, pulmonary tuberculosis in, incidence, Epid. 145
Coccidiosis, proliferative, changes in bile ducts in, Path. 17
Coccogenic eruption and mycosis fungoides, differentiation between in diagnosis of case of extensive dermatitis, Derm. 77
Cold, exposure to, effect on food requirements of sedentary worker, Epid. 71
——, protection of sedentary workers from, in relation to food economy, Epid. 71
Coldness, subjective sense of, in lesions of sensory cortex, Neur. 23
COLE, PERCIVAL P.—Discussion on administration of anæsthetics in Home Military Hospitals, Anæsth. 10
——, operative treatment of ununited fractures of the mandible, Odont. 38-46
Collar stud impacted between vocal cords, Laryng. 72
—— —— —— in left bronchus (J. Dundas Grant), Laryng. 71
Collier, J. S., on apraxia, quoted, Neur. 14
COLLINS, E. TREACHER.—Discussion on case of implantation cyst, Ophth. 11
——, discussion on changes in vitreous resulting from penetrating septic wounds, Ophth. 2
—— —— on direct observation of fundus oculi during period of temporary blindness, Ophth. 6
COLLIS, E. L.—Discussion on epidemiology of tri-nitro-toluene poisoning, Epid. 167
——, discussion on the incidence of industrial tuberculosis, Epid. 133, 148
——, first case of tri-nitro-toluene poisoning, Epid. 151
Colloidal material, gel formation of, in marsupial enamel, Odont. 51, 52
Collosol argentum in treatment of earache, Otol. 18
—— ——, injection in septicæmia, Otol. 49
—— ——, spray injection as method of restoring patency of Eustachian tubes, Otol, 17, 18
—— ——, spraying into nostrils to relieve nasopharyngeal catarrh, Otol. 17, 18
—— iodine or mercury, administration with arsenic, ill-results following, Otol. 18
Coloboma of optic disk and choroid (G. Harvey Goldsmith), Ophth. 10
Colon, gunshot injuries of, disruptive phenomena, Path. 100, 101
——, œsophagus and stomach, abnormal condition of (Reginald Morton), Electr. 16

Colyer, J. F., treatment and results in fractures of mandible, quoted, Odont. 30

Comedones, grouped, in infant (J. M. H. MacLeod), Derm. 111

Commercial clerks, pulmonary tuberculosis in, incidence. Epid. 145

Compass-test reaction defective in lesions of sensory cortex, Neur. 23

Compositors, incidence of pulmonary tuberculosis in, Epid. 147

Concussion-deafness, prognosis, Otol. 9

Condenser method, Lapicque's production of contraction of paralysed muscles by, Electr. 34

Confraternity of the Surgeons of France, patron saints of (C. G. Cumston), Hist. 70-77

Consciousness, dissociation or splitting of, Psych. 1, 9, 11

——, manifest, inaccessibility of mental consent to, Psych. 1

Constipation in cases of gastro-intestinal sepsis, Otol. 16

Consultations, medical and surgical, of sixteenth century (D'Arcy Power), Hist. 55

Contact currents, effect on Kelvin and d'Arsonval galvanometers compared, Electr. 28

Contusion, without wounding, from missiles, Path. 81, 82

Convicts on passage to Botany Bay (1802), diets of, Epid. 81

Convulsions, violent, followed by amaurosis, case (E. Pritchard), Child, 1, 4

Cook, A. H.—Discussion on administration of anæsthetics in home military hospitals, Anæsth. 11

Coolidge control outfit and tube attached to mobile X-ray wagon unit, Electr. 57

—— tube, heating current, transformer for (E. E. Burnside), Electr. 58

—— ——, spiral of, convenient method of heating (A. C. Jordan), Electr. 20

Cooper, G.—Discussion on treatment of injury to peripheral nerves, Electr. 34

Copeman, S. M., F.R.S.—Discussion on Italian Medical War Service, Epid. 54

Copper, colloidal, injections of, in successful treatment of primary carcinoma of nasopharynx. Laryng. 1, 6

Cornea, denudation in Mooren's ulcer, Ophth. 7

Corner, E. M.—The irritant nature of war scar tissue, Electr. 49-53

——, surgery of painful amputation stumps, R.S.M. Lect. 17-24

Cornwall tin-miners, age incidence of maximum frequency of deaths from phthisis in, Epid. 147

Cosmas, St., and Damian, St., miracles said to have been performed by, Hist. 75, 76

—— ——, patron saints of the Confraternity of the Surgeons of France (C. G. Cumston), Hist. 70-77

—— ——, portraits of, Hist. 70, 71, 73

—— ——, temples raised in honour of, Hist. 72

Costa Rica, teeth from, invaded by mould fungus, Odont. 94, 95

Cotton spinning and weaving factory operatives, pulmonary tuberculosis in, incidence, Epid. 145

Counting chamber, new, for enumeration of protozoa and other organisms (J. W. Cropper), M.B.L. 1-12

—— —— —— —— —— —— ——. description, M.B.L. 9

—— —— —— —— —— —— ——, directions for use, M.B.L. 10

—— —— —— —— —— —— ——, ruling of, M.B.L. 9, 11

Cranial injury, onset of toxic jaundice determined by, Epid. 163

Crawford, B., prognosis of toxic jaundice, quoted, Epid. 162

Creighton, C., food rationing and famines in middle ages in England, Epid. 73, 74

Cresol, in destruction of parasite of bilharzia, Epid. 24

Cretinism, almost untreated, in girl, aged 28 years, Child. 20, 21

——, cases of (H. C. Cameron), Child. 20

—— showing delay of epiphyseal development, Child. 20

Crimean War (1854-56), cases of missiles resting in bladder forming nuclei of phosphatic calculi recorded in, Path. 107

Crookshank, F. G.—Discussion on congenital heart-disease in mentally defective child, Child. 6

Cropper, J. W.—Note on a new counting chamber for the enumeration of protozoa and other organisms, M.B.L. 1-12

CROSS, F. RICHARDSON.—Discussion on hysterical disorders of vision, Ophth. 14
Cruelty, impulses to, long-buried, stimulated by sights and deeds of war, Psych. 27
——, primitive, deflection from, Psych. 26
—— ——, reaction against, Psych. 26
Cuirass-cancer, features of, Derm. 74, 75
Cullen, see *Kelly* and Cullen
CUMBERBATCH, E. P.—Nævus treated by X-rays, Electr. 13
——, surgical diathermy, Electr. 37-48
CUMSTON, C. G.—Death of King Henry II of France, with a rare engraving of the event, Hist. 51
——, Morgagni and the Foramen Cæcum, a question of priority, Hist. 49
——, a note on St. Cosmas and St. Damian, the patron saints of the Confraternity of the Surgeons of France, Hist. 70-77
Cunningham, William (of Norwich, *circ.* 1556-59), biographical facts relating to, Hist. 63
Cyanosis following tri-nitro-toluene poisoning, Epid. 157, 165
Cystic tumour of epiglottis, case (W. Jobson Horne), Laryng. 79

Dacryocystitis, double, case of (W. Douglas Harmer), Laryng. 171
Dacryocystotomy (internal), double lachrymal stenosis, right side, successfully treated by, case (James Donelan), Laryng. 120
Dalton-Henry law, absorption of gases by, Anæsth. 17
Damian, St., see *Cosmas*, St.
Danger, freedom from dread in presence of, explanation according to Freud's theory, Psych. 35
——, external, reaction to, components of, Psych. 34
——, real, suggested cause of developed dread in situations of, Psych. 35
Darier's disease, see *Keratosis* follicularis
DAVIDSON, Sir JAMES MACKENZIE.—Discussion on convenient method of heating spiral of Coolidge tube, Electr. 22
DAVIS, E. D. D.—Case of proptosis of the left eye, Laryng. 138
——, dental cyst involving the nose, Laryng. 159
——, discussion on cancer of larynx, Laryng. 128
—— —— on carcinoma of fauces treated by per-oral excision, followed by diathermy, Laryng. 131
—— —— on cystic swelling occluding right cartilaginous meatus, Otol. 7
—— —— on excision of upper jaw for carcinoma of antrum and palate, followed by diathermy, Laryng. 35
—— —— on gastro-intestinal sepsis as cause of Ménière's symptoms, Otol. 24
—— —— on large sub-maxillary calculus, Laryng. 157
—— —— on multiple papillomata of larynx, Laryng. 70
—— —— on pharyngeal pouch treated by diverticulo-pexy, Laryng. 60, 62
—— —— on removal of epithelioma of larynx, Laryng. 153
——, fixation of both vocal cords; tracheotomy, Laryng. 138
——, large dental cyst involving the floor of the nose, Laryng. 158
——, result of the removal of large dental cysts, Laryng. 159
——, symmetrical ulceration of the vocal cords, Laryng. 117
——, three cases of symmetrical nodules of the vocal cords, Laryng. 116
——, war injury of the ear, Otol. 8
DAVIS, H. J. BANKS.—See *Banks-Davis*, H. J.
DAWSON, G. W.—Case of papilloma of the nose, Laryng. 132
——, discussion on cancer of larynx, Laryng. 128
—— —— on lupoid tuberculosis, Laryng. 6
—— —— on saddle-back nose consequent on resection of septum, Laryng. 21
——, perichondritis of the larynx, Laryng. 133
——, tumour of pharynx, Laryng. 134

Deafness absent in bony occlusion of posterior nostrils, Otol. 28
—— —— in case of nasopharyngeal fibroma with mouth-breathing, Otol. 32
—— —— in congenital atresia of choana, Otol. 32
—— —— in pure nasal obstruction, Otol. 28, 29, 41
—— and humoral asthma, case of, advice of Boerhaave in, Hist. 5
—— and orchitis, case (Dan McKenzie), Otol. 79
——, aural vertigo and unilateral obstruction of Eustachian tube, without, Otol. 21, 22
——, bacteriological examination of discharges from nose in cases of, Otol. 40
——, cessation upon removal of adenoids, Otol. 37
——, complete, and complete loss of labyrinth function, ? cause (W. M. Mollison), Otol. 12
——, conditions under which relieved by operations on nose, Otol. 41
——, diseases of nose associated with, first observations, Otol. 26
—— due to adenoids, Otol. 29
—— —— to obstruction of Eustachian tube, Otol. 29
—— —— to septal deflection, Otol. 34
—— following rupture of tympanic membrane, prognosis, Otol. 9
——, functional, total, in soldiers, recovery from, Otol. 13
—— in children with simple nasal stenosis, question of, Otol. 29
——, independent of nasal affections, Otol. 33
——, nasal catarrh without, Otol. 30
——, operations on nose in cases of, when to be undertaken, Otol. 41, 42, 45
——, protracted, resulting from Eustachian catarrh with simple catarrhal otitis media, Otol. 3
——, rare, in nasal polypus, Otol. 29
——, relief, immediate after removal of adenoids, Otol. 31
—— ——, attempted by nasal operations, Otol. 30
—— ——, by nasal and post-nasal spraying and douching, Otol. 41, 45
——, removal of spurs of septum in cases of, Otol. 37
——, simulated, detection of, Otol. 13
——, testing of hearing before operation on nose in cases of, Otol. 39, 45
——, treatment, without promising cure, Otol. 36
Death, attitude of sufferers from war neuroses towards, Psych. 36
——, interpretation by unconscious mind, Psych. 36
——, sudden, in infant with enlarged suprarenals (E. Pritchard), Child. 35
Deformities developing during electrical treatment of muscles with injured nerve supply, Electr. 32, 35
——, hysterical, in civil life following injury, R.S.M. Discussion 17
—— —— —— —— produced by spasm, R.S.M. Discussion 17, 19
Dejerine, factors influencing changes of intelligence in aphasia, quoted, Neur. 4
Delivery, instrumental, under twilight sleep, analyses of ten cases, Obst. 26
—— under scopolamine-morphine narcosis, condition of patients after, Obst. 22, 31-33
Dementia preceding aphasia, Neur. 6
—— —— ——, cases reported, Neur. 7-9
Dental cyst involving nose (E. D. D. Davis), Laryng. 159
—— —— (large) involving floor of nose (E. D. D. Davis), Laryng. 158
—— cysts and cysts of floor of nose, collection of (A. Brown Kelly), Derm. 58
—— —— —— —— —— —— ——, differentiation between, Derm. 58
—— —— and supposed diseases of antrum, confusion between (A. Brown Kelly), Derm. 58
—— ——, removal of, result (E. D. D. Davis), Laryng. 159
—— ——, treatment, Laryng. 58
—— laboratory, importance of, in jaw injuries department, Odont. 7
—— surgeons, co-operation with physicians and general surgeons in treatment of jaw injury cases, Odont. 6
—— —— without medical qualifications, share of, in treatment of jaw injury cases, Odont. 7
Dentinal fibril, penetration into tubes in marsupial enamel, Epid. 51, 54, 55

Dentinal origin of tubes in marsupial enamel, confirmation, Odont. 53
—— tubes, invasion by mould fungus, Odont. 94, 95
Dentine, destruction by mould fungus, Odont. 94, 96, 99
——, penetration by *Saccharomyces mycoderma*, Odont. 99
Dentists, work of, in T.N.T. factories, Epid. 156
Denture, method of fitting, in case of total loss of hard palate and exposure of antral cavities in mouth, Laryng. 90
Dentures, aspirated into air passages, cases reported, Odont. 108, 109
Depression, intense, attacks produced by painful war experiences, Psych. 9, 10
Dermatitis due to high explosives used in recent air raids, four cases (J. H. Sequeira), Derm. 12
—— herpetiformis, case (George Pernet), Derm. 99
—— —— of auricle, Otol. 54
——, report on case shown December 20, 1917 (E. G. Graham Little), Derm. 77
Dermatosis, pre-cancerous (Bowen's disease), Derm. 42
Dermoid cyst (?) occluding right cartilaginous meatus (H. J. Banks-Davis), Otol. 6
—— —— of nose, remains of, destroyed by diathermy, Electr. 44
—— (endotheliomatous) of ovary, removal of, and (thirteen and half years later), of fibro-endothelioma of vagina (H. R. Spencer), Obst. 59
—— of ovary, endothelioma in, rarity, Obst. 64
Devizes jail, official ration at, Epid. 80
Diabetes benefited by Cheltenham waters, Baln. 3
Diabetic organism, conversion of glycocoll and alanin into glucose in, Epid. 63
Diagnosis, cases for (G. Badgerow), Laryng. 24
—— —— (J. Donelan), Laryng. 135, 170
—— —— (S. E. Dore), Derm. 48, 65, 66
—— —— (E. G. Graham Little), Derm. 58
—— —— (J. Porter Parkinson), Child. 11
—— —— (W. Knowsley Sibley), Derm. 70, 83
—— —— (J. H. Stowers), Derm. 103
—— —— (laryngeal) (A. Wylie), Laryng. 121
—— —— (laryngeal tuberculosis) (G. C. Cathcart), Laryng. 84, 85
—— —— (multiple enchondromata) (H. C. Cameron and W. H. Trethowan), Child. 45-49
—— —— (possible early case of miscalled multiple idiopathic hæmorrhagic sarcoma of Kaposi) (J. J. Pringle), Derm. 107
—— —— (tumour of palate (J. Donelan), Laryng. 134
Diarrhœa, cases of, removal during dysentery epidemics, Epid. 8, 9
——, deaths from, during siege of Paris, Epid. 75
——, occurrence of, in Eastern campaigns, Epid. 2
Diathermy and galvano-cautery, respective actions contrasted, Electr. 37, 38
——, avoidance of injury of blood-vessels and bone during, Electr. 40, 48
—— current, application of, Electr. 38
—— —— ——, electrodes for use in, Electr. 38
—— —— ——, technique of, Electr. 38
—— following excision of upper jaw for carcinoma of antrum and palate (N. Patterson), Laryng. 34
—— —— per-oral excision for carcinoma of fauces (W. Hill and N. Patterson), Laryng. 130
—— in amputations, Electr. 46, 48
—— in breaking down adhesions between soft palate and posterior pharyngeal wall, Electr. 47
—— —— —— synechiæ of nose, Electr. 47
—— in destruction of remains of dermoid cyst of nose, Electr. 44
—— —— of septic remains of tonsils, Electr. 44
—— —— of thyroglossal cyst, Electr. 44
—— in exploration of brain abscess, Electr. 44
—— knife, Electr. 38, 39, 44

Diathermy, ligature of carotid artery before, Electr. 44, 48
——, surgical (E. P. Cumberbatch), Electr. 37-48
——, treatment by, apparatus for, Electr. 46
—— ——, healing of cavities after, Electr. 46
—— —— of cancer of auricle and mastoid region, Electr. 46
—— —— —— of soft palate, Electr. 48
—— —— —— of pharynx, Electr. 43, 46, 47
—— —— —— of tongue, Electr. 44
—— —— —— of tonsil, Electr. 43, 45
—— —— —— of uterus-cervix, Electr. 45, 48
—— —— of cancerous glands of neck, Electr. 47
—— —— of extensive epithelioma, affecting soft and hard palate, tonsils, and faucial pillars, result (N. Patterson), Laryng. 23
—— —— of extrinsic cancer of larynx, Laryng. 128
—— —— of injuries to peripheral nerves, Electr. 33, 34
—— —— of innocent growths, Electr. 42
—— —— of lupus, Electr. 44
—— —— of malignant growths, complications. Electr. 40, 41, 44, 45, 48
—— —— —— ——, difficulties in, Electr. 39
—— —— —— ——, duration of life after, Electr. 42
—— —— —— ——, fungating, Electr. 39, 45, 48
—— —— —— ——, results, Electr. 41
—— ——, of nævus, Electr. 42, 46, 47
—— ——, of papillomata of bladder, Electr. 46
—— ——, of sarcoma of pharynx, Electr. 47
—— ——, results, Electr. 47
Dickinson, Vincent, Discussion on case of vitiligo patches with central pigmented mole, Child. 18
Dickson, W. E. Carnegie.—Congenital obliteration of the bile ducts, Child. 27
Dielectric oil, therapeutic uses of, Electr. 25, 26
Diet at Millbank Penitentiary, Epid. 77-80
——, energy value, and family income in industrial classes, correlation between, Epid. 69
—— —— ——, reduction of, effect on health of troops during siege of Kut-el-Amara, Epid. 75
—— of industrial workers, number of calories required, Epid. 82
—— of prisoners of war (1797), Epid. 81
——, protein minimum in, Epid. 64, 71, 72
——, substitution of carbohydrate for protein in, Epid. 63
——, see also *Calorie* value of diet
Dietary of British Army, variation in, Epid. 54
Diets, energy value of. Epid. 62
—— of convicts on passage to Botany Bay (1802), Epid. 81
Digestion, amino-acids in, use of, Epid. 57
Digitalis in mitral stenosis after onset of fibrillation of auricle, effect of, as compared with effect in prefibrillation stage, Therap. 10
—— series of remedies, comparative value in heart failure of auricular fibrillation (A. J. Whiting) Therap. 1-52
—— —— ——, effect on heart during fibrillation of auricle, Therap. 40
—— —— —— in case of mitral stenosis with fibrillation of auricle, comparative potency, Therap. 49, 50
—— —— —— —— —— —— —— —— —— ——, comparative toxicity, Therap. 48
—— —— ——, method of administration, Therap. 41, 42
——, tincture of, effect in case of mitral stenosis before and after fibrillation of auricle, Therap. 43
—— —— ——, in massive single dose, in case of mitral stenosis, with fibrillation of auricle, Therap. 31

Digitalis, tincture of, effect of second course in case of mitral stenosis with fibrillation of auricle, Therap. 12

—— —— —— on pulse-rate day before onset of fibrillation of auricle in case of mitral stenosis, curve showing, Therap. 3, 4

Di-nitro-benzol, amblyopia due to, Epid. 156

Dinnick, O. Tilson.—Discussion on undiagnosed cancer of uterus complicating myoma treated by total hysterectomy, Obst. 58

——, inversion of the uterus complicated by intestinal obstruction, Obst. 45

Diphtheria, amœbic and bacillary, resemblances sometimes observable between, Epid. 6

—— —— ——, transmission by water compared, Epid. 7, 8

—— antitoxin, dose, serum phenomena in relation to, Med. 2

——, attack of, serum phenomena in relation to severity of, Med. 2

—— in subject of hæmophilia, Child. 32

——, prevalence in Eastern campaigns, Epid. 29

—— relapse of, phenomenon mistaken for, Med. 2

Diplegia, atonic, congenital cerebral disease, Neur. 25

——, cerebral, suggested anatomical lesion in cases of, Neur. 26

Diploma in laryngology, granting of, advocated, Laryng. 28

Disinfectants used in cholera outbreak in Italian army (1915), Epid. 45, 46, 47

Disinsector, destruction of lice by, Epid. 38

Disruptive phenomena in gunshot injuries (S. G. Shattock, F.R.S.), Path. 47-118

Dissociation, see *Consciousness*, dissociation, or splitting of

Diverticulo-pexy, pharyngeal pouch treated by (William Hill), Laryng. 60

Diverticulum, Meckel's, gunshot wound of, double, penetrating, Path. 99

Dog, ablation of cerebral hemispheres in, results, Neur. 31

Dogs and cats, respective quantity of chloroform required to produce anæsthesia in, Anæsth. 20

——, chloroformed, carbon monoxide in, how arising, Anæsth. 18

—— experiments on, determining anæsthetic and lethal quantities of chloroform in narcosis, Anæsth. 19

—— —— —— —— —— —— —— ——, position of animal under, Anæsth. 19

——, lethal effects of chloroform in amounts incapable of producing anæsthesia on, Anæsth. 15, 16

Dolamore, W. H.—Bruhn-Lindemann needle extension for fixing edentulous portions of a fractured mandible, Odont. 66

Donald, enumeration of bacteria and cells of blood and cerebro-spinal fluid by drop-measuring method, quoted, M.B.L. 4

Donelan, James.—Case of double lachrymal stenosis, right side successfully treated by internal dacryocystotomy (West's operation), Laryng. 120

——, cases for diagnosis, Laryng. 135, 170

——, discussion on carcinoma of fauces treated by per-oral excision, followed by diathermy, Laryng. 131

—— —— on case of hyper-adduction of left arytænoid cartilage, Laryng. 12

—— —— on cases of stenosis of glottis, Laryng. 78

—— —— on influence of diseases and abnormalities of nose on ear, Otol. 43

—— —— on operation on mastoid for acute suppurative inflammation followed by insertion of B.I.P., Otol. 75

—— —— on paralysis of arytænoideus, Laryng. 164

—— —— on saddle-back nose consequent on resection of septum, Laryng. 21

——, repair of nose by paraffin injection, Laryng. 135

——, specimen of epithelioma of left vocal cord two years after operation, Laryng. 7

——, tumour of the palate in a child, aged 3 months, for diagnosis, Laryng. 134

Dore, S. E.—Case of keloid ? Derm. 55

——, case of keloid in a child aged 7, Derm. 56

—— —— of (?) miliary syphilide, Derm. 100

Dore, S. E.—Case of persistent erythema (exhibited for Sir Malcolm Morris), Derm. 60
——, case of psoriasis, Derm. 49
——, cases for diagnosis, Derm. 48, 65, 66
——, discussion on cases for diagnosis, Derm. 73, 84, 104
—— —— on case for diagnosis, possibly early case of *miscalled* multiple, idiopathic, hæmorhagic sarcoma of Kaposi, Derm. 110
—— —— —— of extensive dermatitis, Derm. 46, 78
—— —— —— of fibrosarcomata, Derm. 42
—— —— on guttate morphœa, Derm. 95
—— —— on syphilitic rash appearing after twenty-three injections of novarsenobillon, Derm. 80
——, ichthyosis hystrix linearis of palms, Derm. 99
——, small-spored ringworm in a woman, aged 37, Derm. 6
——, two cases of alopecia areata, Derm. 61
—— —— —— of morphœa guttata, Derm. 26
Doubleday, F. N.—Discussion on work at a jaw injuries centre, Odont. 25
Dove, P. W., and Weber, F. Parkes.—Case of pruritus in Hodgkin's disease—lymphogranulomatosis pruriginosa, Derm. 68
Downs, Lord, case of, advice of Boerhaave in, Hist. 6
Drainage in treatment of painful amputation stumps, R.S.M. Lect. 23
Dread and apprehension, fear as a mental state of, Psych. 33
——, developed, in real danger, sexual hunger in relation to, Psych. 35
—— ——, in situations of real danger, suggested cause of, Psych. 35
——, freedom from, in presence of dangers, explanation according to Freud's theory, Psych. 35
Dreams, horrible, following revolting war-experiences, Psych. 7
——, see also *Battle dreams*
Drop-bottle for use in ether administration in home military hospitals, Anæsth.
Drop-measuring method in enumeration of bacteria, M.B.L. 4
—— —— in enumeration of cells of blood and of cerebro-spinal fluid, M.B.L. 4
—— —— —— of protozoa, M.B.L. 4
Dry-cupping, application in gunshot wounds of larynx causing œdema, Laryng. 193
Du Bois, correlation between body mass and energy, Epid. 68
Ductus arteriosus (patent ?), in case of congenital heart disease (J. Porter Parkinson), Child. 38
Durham, A. E., statistics as to deaths and recoveries after aspiration of foreign bodies into respiratory passages, quoted, Odont. 110
Dust, injurious (dust of silica), inhalation of, affecting prevalence of tuberculosis, Epid. 135
Dutch Universities, indebtedness of British to, Hist. 15
Dysentery accompanying famine in England (1315-16), Epid. 73
——, amœbic and bacillary, mixed, Epid. 7
—— ——, carriers of cysts, Epid. 9
—— ——, concomitant of epidemic due to other infections, Epid. 7
—— ——, in Eastern campaigns, no preponderating prevalence, Epid. 5, 6
—— ——, percentage of cases showing *Entamœba histolytica*, Epid. 6, 7
—— ——, prevention, Epid. 7
—— —— ——, difficulties, Epid. 8
——, asylum, Epid. 77
——, carriers of, detection and segregation, Epid. 8, 9
——, deaths from, during siege of Paris, Epid. 75
——, epidemic, at Millbank Penitentiary, Epid. 77
—— ——, in Mesopotamia, Epid. 3
—— ——, removal of diarrhœa cases during, Epid. 8, 9
—— epidemics in Eastern campaigns, Epid. 2
—— —— —— —— due to fly activity, Epid. 4

Dysentery epidemics in Eastern campaigns not due to one single bacteriological agent, Epid. 5

—— —— —— ——, seasonal incidence, Epid. 4

—— in Egypt, Epid. 3

—— in Salonica, Epid. 3

——, irritating and badly-cooked food predisposing to, Epid. 8

——, outbreak at Gallipoli Peninsula (1915), Epid. 2, 3, 4

—— outbreaks in France due to different bacteriological types, Epid. 5

——, prophylaxis against, by field sanitation, Epid. 8

——, see also *Fæces*, dysenteric

Dyspepsia, functional, asthenic, benefited by Lansdown water, Cheltenham, Baln. 3

—— ——, sthenic, benefited by Fieldholme water, Cheltenham, Baln. 3

—— —— ——, leading to arterio-sclerosis, Baln. 4

Dysphagia and dyspnœa produced by pre-tracheal abscess of acute development, case (J. Dundas Grant), Laryng. 72

—— following gunshot wounds of larynx, Laryng. 180

Dyspnœa and dysphagia produced by pre-tracheal abscess of acute development, case (J. Dundas Grant), Laryng. 72

—— and regurgitation of liquids during drinking in tuberculosis of larynx relieved by intralaryngeal operation, case (J. Dundas Grant), Laryng. 63

——, urgent, following fracture of four rings of trachea; operation, recovery (Sir W. Milligan), Laryng. 54

Ear and nose, diseases of, connexion between, advocates of, catarrhalist school, Otol. 27, 28, 34

—— —— —— —— —— ——, rarefactionist school (negative pressure advocates), Otol. 28, 32, 38

—— —— ——, theory of independence one of the other (separatist school), Otol. 27

—— disease, absent in pure nasal obstruction, Otol. 28, 29, 41

——, fibroma of (L. H. Pegler), Otol. 67

——, influence of diseases and abnormalities of nose upon, Discussion, Otol. 25-46 (H. J. Banks-Davis, 44; James Donelan, 43; P. G. Goldsmith, 39; J. Dundas Grant, 38; Albert Gray, 33; C. Heath, 34; W. Hill, 25, 44; W. Jobson Horne, 40; T. Mark Hovell, 37; W. H. Kelson, 41; N. Patterson, 31; Urban Pritchard, 36; H. Lambert Lack, 32; W. Stuart Low, 40; Sir StClair Thomson, 32, 43; H. Tilley, 41; P. Watson-Williams, 34; C. Woakes, 36)

—— —— —— —— ——, discussion at British Medical Association Annual Meeting (1900), Otol. 26, 27

—— —— —— —— ——, gradual recognition, historically traced, Otol. 25, 26

——, middle, disease of, Ménière's symptoms due to, Otol. 15

—— ——, foreign body removed from, by post-aural operation (H. J. Banks-Davis), Otol. 7

—— ——, septic infection from nose invading, Otol. 40, 43

—— ——, suppurative disease of, accompanied by micro-organisms due to other causes, Otol. 49

—— —— suppuration, chronic, and cholesteatoma, treated by radical mastoid operation, with retention of cholesteatoma matrix, case (J. Dundas Grant), Otol. 77

——, myiasis of (E. B. Waggett), Otol. 14

——, reflex influence of nasal lesions on, Otol. 26, 31

——, war injury of, case (E. D. D. Davis), Otol. 8

—— —— —— ——, loss of hearing in, Otol. 8, 9

Earache, association with sphenoidal sinus disease, Otol. 42, 43

——, method of relieving, Otol. 18

Ears, middle, suppuration of, danger of removal of adenoids during, Otol. 37

Eastern Campaigns, epidemics of (G. S. Buchanan), Epid. 1-30

Eccles, W. McAdam.—Discussion on work at a jaw injuries centre, Odont. 25

EDDOWES, ALFRED.—Discussion on case for diagnosis, Derm. 59, 84
——, discussion on syphilitic rash appearing after twenty-three injections of novarsenobillon, Derm. 80
—— —— on (?) tumour of parotids involving skin, Derm. 74
——, lupus erythematosus of unusual distribution and character, Derm. 75
Edelmann-Galton whistle, Otol. 5
Edentulous fragment, posterior, treatment, Odont. 17
EDER, M.—Discussion on repression of war experience, Psych. 19
Edie, aggregation of hæmoglobin and chloroform outside body, quoted, Anæsth. 25
Edinburgh, University of, offshoot of University of Leyden, Hist. 15
Edmunds, W., and Ballance, Sir C. A., outside diameter of adult aorta, quoted, Path. 116
Education, medical, too little stress laid upon mental condition of patients in, Neur. 43
Ego ideal and anti-ego impulses, conflict between, Psych. 26
—— ——, conflict of sexual instinct with, Psych. 32, 33
—— —— of Freud, Psych. 26
—— ——, wish producing neurosis in conflict with, Psych. 31
Egypt, Armenian refugees in, pellagra among (1917), Epid. 28
——, bilharzia in. Epid. 23
——, British troops in, relapsing fever among, Epid. 21
——, prevalence of dysentery in, Epid. 3
—— —— of enterica in (1915-16), Epid. 9, 10
Elbow-joint, tuberculosis of, X-ray treatment beneficial, Electr. 12
Electric current led off from human body, galvanometer deflexion estimates, Electr. 24, 27, 28
—— ——, measurement in human subject, Electr. 23, 24, 25
—— currents led off from human body, reply to criticisms of Professor W. M. Bayliss (A. E. Baines), Electr. 23-27
—— motor, Geiger's, Odont. 39
—— —— ——, advantages, Odont. 39
Electricity, production of contractions in muscles with injured nerve supply by, Electr. 30, 32, 34
——, treatment by, of functional nervous disorders in soldiers, Neur. 48
—— ——, of scar tissue of war wounds and amputation stumps, Electr. 54, 55
—— ——, of suppurating wounds at bedside, Electr. 54
—— ——, of war neuroses, Neur. 40
Electro-motive force in fruit, leaves and vegetables, Electr. 26, 27
—— —— ——, measurement in human subject, Electr. 23, 25
Electro-physiological phenomena, interpretation of (A. E. Baines), Electr. 23
Electrodes for diathermy of growths of special parts, Electr. 39
——, two active, use in removal by diathermy of fungating malignant growths, Electr. 39
—— used in application of diathermy current, Electr. 38
Electroscope, alpha-ray and gamma-ray, estimation of amounts of radium by. Path. 2
Electrostatic capacity of human subject under normal conditions of exterior insulation, Electr. 24, 25
Electro-therapeutics and radiology, education in, Cambridge scheme for, Electr. 6
—— —— —— ——, London scheme for, Electr. 5
—— —— ——, necessity for education in (G. Harrison Orton), Electr. 1
ELLIOT, R. H.—Changes in the vitreous resulting from penetrating septic wounds, Ophth. 1
ELMSLIE, R. C.—Discussion on treatment of injury to peripheral nerves, Electr. 32
——, muscle contracture following injury, R.S.M. Discussion 16
Emboli, malignant, vacuolation in vessels containing, Path 25
Emigration, effect on great plague epidemics of London (1665) not appreciable, Epid. 90
Employment, alternation of, safeguard in T.N.T. factories, Epid. 154
Empyema, operation for. anæsthetics suitable for, Anæsth. 7, 12
Enamel block detached from enamel column, Odont. 63, 64
——, human, at bottom of carious fissure with spherides and enamel prisms in transverse section, Odont. 61, 63

Enamel, interprismatic substance, independent formation, Odont. 62
——, marsupial, calcification of, Odont. 60
—— ——, fixation of specimens, Odont. 51
—— ——, forming, incorporation of Tomes's processes into, Odont. 56, 57, 65
—— ——, "gel" formation of colloidal material in, Odont. 51, 52, 65
—— ——, tubes in, between prisms, Odont. 55, 56
—— —— ——, nature of, Odont. 51
—— —— —— ——, views as to, Odont. 50
—— —— ——, origin discussed, Odont. 51, 52
—— —— ——, penetration by dentinal fibril, Odont. 51, 54, 55
—— —— ——, proof of, Odont. 52
—— prisms, calcification of, Odont. 61
——, tubular, of marsupials (J. Howard Mummery), Odont. 49
—— —— ——, nature of, Odont. 51
Encephalitis, see *Polio-encephalitis*
Enchondromata, multiple (case for diagnosis) (H. C. Cameron and W. H. Trethowan), Child. 45-49
Endoneuritis, ascending, in amputated limbs, origin of, Electr. 52
Endo-rhinoscopy (nasal), illustrations of (epidiascope) (P. Watson-Williams), Laryng. 50
Endoscopy, per-oral, value of, Odont. 110-112
——, value of, surgical contretemps illustrating (Herbert Tilley), Laryng. 73
Endothelioma, diagnosis, Path. 19
—— in dermoid tumour of ovary, rarity, Obst. 64
—— —— —— ——, report on, of Pathology Committee, Obst. 64
——, malignant, of leg, Path. 20
—— —— ——, case of, clinical history, Path. 20
—— —— ——, histological description of specimen, Path. 22
—— —— ——, low power view of, showing large spaces containing fluid blood with area of solid growth, Path. 20
—— —— ——, tumour-cells of, Path. 22, 23
—— of post-nasal space (W. H. Jewell), Laryng. 81
—— on back of child, capillary system of, Path. 30, 31
—— —— ——, clinical history, Path. 27
—— —— ——, connected with normal tissues, Path. 32, 33
—— —— ——, cytoplasm of cells of, Path. 28
—— —— ——, histology, Path. 27-32
—— —— ——, resembling hæmangioma hyperplasticum, Path. 27
Endotheliomata, malignant, blood-spaces in, Path. 25
—— —— formation of lumina in, Path. 24
Endothelium of blood space formed by tumour cells, Path. 22
——, tumours arising from (E. H. Kettle), Path. 19
—— —— —— ——, cases, Path. 19-34
—— —— —— —— ——, resemblance to atypical chorionepitheliomata, Path. 34
Energy, carbohydrate and protein as sources of, compared, Epid 63
—— intake and body mass, correlation between, Epid. 68
—— —— —— —— —— ——, positive and linear, Epid. 68
—— intakes, average, of weavers, light metal workers and quarriers, compared, Epid. 67
——, output of, calorie-value of diet in proportion to, Epid. 56, 57
—— requirements of various grades of work, Epid. 70
——, specific, of foodstuffs, Rubner's theory, Epid. 62
—— used and work performed, relation between, Epid. 66
—— value of diet, reduction during siege of Kut-el-Amara, effect on health of troops, Epid. 75
—— —— of diets, Epid. 62
—— —— of food absorbed, Epid. 62

Energy value of food consumed in relation to rationing, Epid. 69, 70
England, famines in (1194-96, 1257-59, 1315-16), diseases associated with, Epid. 73, 74
——, food rationing in, in Middle Ages, Epid. 73
Entamœba coli cysts, distribution in saline emulsion of stool, M.B.L. 7
—— —— —— in stools, enumeration by ruled slide and wax ring method, M. B.L. 7
—— *histolytica*, Epid. 6
—— ——, as cause of dysentery, Epid. 5
—— ——, cysts of, Epid. 6
—— —— percentage of dysentery cases showing, Epid. 6, 7
Entamœbæ, enumeration, differential, of nuclei, M.B.L. 2
—— ——, total, M.B.L. 2
Enterica, occurrence of, in Eastern campaigns, Epid. 9
Epidemic, course of, effect of limitation of number of susceptible persons on, method for examining, Epid. 118
—— curve, Type IV of Professor Karl Pearson, Epid. 87, 117, 119
—— disease, period of infection, extreme shortness in comparison with length of epidemic, Epid. 121
—— ——, person once infected with, remaining immune during continuance of epidemic, Epid. 120
—— ——, persons who have succumbed to, ceasing to be infective and again becoming susceptible, Epid. 119
—— —— —— —— —— ——, remaining equally infectious throughout course of epidemic, Epid. 118
—— diseases, partial immunization to, owing to slight exposures, Epid. 117
——, form of, calculation by integraph, Epid. 121
Epidemics, best place for study of, Epid. 89, 90, 131
——, curves of, constants denoting, Epid. 87, 88
—— —— of two, forms of, Epid. 124
——, infectivity, modifying factors, Epid. 123
——, loss of infecting power by, Epid. 88
——, mathematical theory of, Epid. 115-127
—— of Eastern campaigns (G. S. Buchanan), Epid. 1-30
——, smallness of numbers infected in relation to total population, Epid. 116
——, theories of, Epid. 88
——, uniform increase in number of susceptible persons per unit of time, Epid. 123
——, values of infectivity of β_1 and β_2, and of standard deviation and of percentage number of units left uninfective, Epid. 122
Epidemiology, theories of, differentiation between, by standard deviation, Epid. 87
—— theory of, certain aspects, in special relation to plague (John Brownlee), Epid. 85
—— ——, plague as test of, Epid. 89
Epidermis, layers of, overgrowth in relation to amount of radium introduced into skin of rats, Path. 6, 7
Epiglottis, cystic tumour of (W. Jobson Horne), Laryng. 79
—— lifter, Mount Bleyer's, Laryng. 65
——, method of lifting in case of fibro-papilloma of larynx, Laryng. 65
——, pendulous, in fibro-papilloma of larynx (J. Dundas Grant), Laryng. 64
——, solid tumour of (W. Jobson Horne), Laryng. 79, 114
——, tumour of, microscopic section from case of (W. Jobson Horne), Laryng. 139
Epilepsy, latent, vertigo due to, method of relieving, Otol. 23
Epileptiform cases of vertigo, Otol. 19
—— —— ——, treatment, Otol. 19, 20
Epineural sleeve, removal of nerves by, R.S.M. Lect. 22
Epineurium, preservation, or not of, shapes of nerve-endings dependent on, R.S.M. Lect. 11
Epiphyses, delay of development of, in case of cretinism, Child. 20
Epistaxis, arrest by application of coagulose, Child. 8, 9

Epithelial cells, intracellular bridges of, covering, Odont. 59
Epithelioma and sarcoma of antrum, malignancy compared, Laryng. 34
——, extensive, affecting soft and hard palate, tonsils, and faucial pillars, treatment by diathermy, result (N. Patterson), Laryng. 23
—— of ethmoidal labyrinth, lateral rhinotomy, removal (Dan McKenzie), Laryng. 31
—— of larynx, in lady aged 46, ten months after laryngofissure (Sir StClair Thomson), Laryng. 13
—— —— removed by window resection of thyroid cartilage (H. Lambert Lack), Laryng. 149, 150
—— of left vocal cord in syphilitic subject, Laryng. 7, 9
—— —— —— ——, specimen, two years after operation (James Donelan), Laryng 7
—— of soft palate and uvula (A. Wylie), Laryng. 110
Epithelium, downgrowths in skin of rats inoculated with radium showing appearances similar to "cell-nests" of squamous-celled carcinoma, Path. 4, 5, 6, 14, 16, 17
Equilibration, disturbances, in aviators and gunners, due to nasal obstruction, Otol. 2
Ernutol in relief of Ménière's symptoms, Otol. 20
Erythema ab igne, or possibly "melanopathia syphilitica" of Wilson, case (E. G. Graham Little), Derm. 53
——, chronic persistent, Derm. 31
——, circinate, possibly "erythème annulaire centrifuge" of Darier, case (E. G. Graham Little), Derm. 1
—— elevatum diutinum (J. L. Bunch), Derm. 29
—— —— ——, pathologist's report, Derm. 29
——, gyrate, Derm. 2
—— multiforme perstans (J. H. Stowers), Derm. 111
——, persistent, case for diagnosis (Sir Malcolm Morris), Derm. 60
Erythrodermia, pre-mycotic (early mycosis fungoides), case (George Pernet), Derm. 97
Erythromelalgia, case (H. C. Cameron), Child. 25
——, see also *Acrocyanosis*
Esmarch's operations, reasons for preference of arthroplasty of temporo-mandibular joints for ankylosis to, Odont. 89
Ether, administration by intratracheal method in plastic face surgery, Anæsth. 12
—— —— in home military hospitals, Anæsth. 5
—— —— —— —— ——, by open method, Anæsth. 5, 6
—— —— —— —— ——, good results from, Anæsth. 6
—— —— —— —— —— in orthopædic cases, Anæsth. 8
—— —— —— —— ——, points to be observed in, Anæsth. 5
—— —— —— —— ——, preliminary injections, Anæsth. 5
—— anæsthesia, first demonstration of, by W. T. G. Morton, Hist. 66, 67
—— ——, in treatment of functional aphonia, Laryng. 184
—— ——, ventilation of lung during, Anæsth. 25
—— and chloroform, administration of chloroform with, apparatus for (Hugh R. Phillips), Anæsth. 13
—— ——, mixed administration, in home military hospitals, Anæsth. 6
Ether-bronchitis, occurrence in home military hospitals, Anæsth. 9
——, injection as dressing after mastoid operation, Otol. 75
——, intratracheal administration during septal resection, accident following, Laryng. 73, 74
—— —— —— in jaw surgery, Laryng. 35
——, warm, administration causing venous congestion in orthopædic cases, Anæsth. 8
—— —— —— in cases of chronic shock and sepsis, Anæsth. 7
—— —— —— in home military hospitals, Anæsth. 7, 12
Etherization, in treatment of war neuroses, Neur. 40
Ethmoid and left frontal sinus, mucocele of, Laryng. 115
——, malignant growths in, amenability to surgery, Laryng. 32
Ethmoiditis, necrosing, Otol. 26

Ethyl, chloride of, commencing induction with, in administration of ether in home military hospitals, Anæsth. 5, 12
Eucalyptol, sulphur and oil of sesame, intramuscular injections in psoriasis, Derm. 49, 50
Europe, medical education of, influence of Boerhaave on, Hist. 15
Eustachian tube and fronto-nasal canal, path of infection between, Otol. 31
—— ——, obstruction in Ménière's disease, mechanical and sensory elements, Otol. 22, 23
—— —— ——, causing deafness, Otol. 29
—— ——, size and position of, in children, Otol. 29
—— ——, unilateral obstruction, without deafness, in aural vertigo, Otol. 21, 22
—— tubes, catarrh of, accompanying simple catarrhal otitis media, protracted duration, Otol. 3
—— ——, closure of, accompanying Ménière's symptoms, Otol. 16
—— ——, patency, method of restoring, Otol. 17, 18
Evans, Lovatt, calcification of enamel, quoted, Odont. 60
Expiration, tremors of vocal cords chiefly noticed during, Laryng. 149
Explosives, high, effect upon central nervous system, Path. 118
—— ——, used in recent air raids, dermatitis due to, four cases (J. H. Sequeira), Derm. 12
Extradural abscess perforating skull (R. Lake), Otol. 59
Extra-oral appliances, necessity for, in comminuted fractures of mandible, from angle to angle, with no existing lower teeth, Odont. 80-83, 85
Extremities and trunk, extensive nævus of, involving palms and soles, case (George Pernet), Derm. 9
——, upper and lower, bones of, osteomalacia sclerotica affecting, Path. 39, 40
Eyam (Derbyshire), plague at (1666), Epid. 130
Eye diseases and diseases of nose, relations between, awaiting further investigation, Laryng. 26
——, globe of, gunshot wounds of, disruptive effect, Path. 118
——, left, proptosis of, case (E. D. D. Davis), Laryng. 138
Eyeball, penetrating septic wounds of, changes in vitreous resulting from, based on examination of fifty-four eyeballs (R. H. Elliot), Ophth. 1
Eyelids, suture together, followed by improvement in keratitis, Ophth. 8
Eye-strain as factor in causation of alopecia areata, Derm. 62
Eyes of rabbits, experimental injection with tubercle-bacillus causing infection of ciliary body, Ophth. 1

Face, left side of, shrapnel wound of (G. S. Hett), Laryng. 95
—— —— —— —— ——, operation for, Laryng. 96
—— surgery, see *Plastic* face surgery
Facial spasm, clonic, following injury, R.S.M. Discussion 4
—— tic following injury, R.S.M. Discussion 4
Factory and Workshop Act, toxic jaundice, not T.N.T. poisoning, notifiable under, Epid. 165
Fæces, dysenteric cysts of *Giardia* (*Lamblia*) *intestinalis* in, periodic rhythm, M.B.L. 2
——, enumeration of *Entamœba coli* cysts in, method employed, M.B.L. 7
Faith and suggestion in connexion with cessation of repression, Psych. 14, 15, 19, 20
Family means and energy value in industrial classes, correlation between, Epid. 69
Famine and tuberculosis, relation between, Epid. 83
Famines in England (1194-96, 1257-59, 1315-16), diseases associated with, Epid. 73, 74
——, Indian, type of sickness prevailing in, Epid. 83
——, type of sickness prevailing in, Epid. 83
—— unaccompanied by typhus fever, Epid. 74
Faradic current, graduated contraction method in treatment of muscles with injured nerve supply, Electr. 31
Farm labourers, pulmonary tuberculosis in, incidence, Epid. 145, 146
FARRAR, REGINALD.—Discussion on Italian Medical War Services, Epid. 59
——, discussion on theory of epidemiology in relation to plague, Epid. 129
Fasting individuals, metabolism of, Epid. 64

Fat, calorie value of, Epid. 62
——, daily amount consumed by various groups of industrial workers, Epid. 70
—— in body, total store of calories in, Epid. 65
Fats stored in body, Epid. 58
Fauces, cancer of, operation for, followed by fatal hæmorrhage, Laryng. 131
—— —— ——, preceded by ligature of external carotid artery, Laryng. 131
—— ——, treated by per-oral excision, followed by diathermy (W. Hill and N. Patterson), Laryng. 130
Faucial pillars, tonsils, and soft and hard palate, extensive epithelioma, affecting, treatment by diathermy, results (N. Patterson), Laryng. 23
Fear as a mental state of dread and apprehension, Psych. 33; see also *Anxiety*, morbid
——, development of, prevention, construction of psycho-neurotic symptoms in relation to, Psych. 33
——, increasing sense of, producing sense of shame, Psych. 31
——, "real," components of, Psych. 34
——, repression under war conditions, Psych. 29
FEARNSIDES, E. G.—Essentials of treatment of soldiers and discharged soldiers suffering from functional nervous disorders, Neur. 42
Feet, soles of, and palms of hands, punctate keratosis of, two cases occurring in cousins-german (Sir James Galloway), Derm. 85-90
Femur, fracture, comminuted, extensive, caused by small shell fragment, Path. 50
Fenestra ovalis and rotunda, loss of safety-valve action in, producing vertigo, Otol. 23
Fibro-endothelioma of vagina, removal of, thirteen and half years after removal of endotheliomatous dermoid of ovary (H. R. Spencer), Obst. 59
Fibroids and cancer of body of uterus, combined, treatment by amputation at cervix, Obst. 55
Fibroma, aural, case (L. H. Pegler), Otol. 67
—— ——, clinical description, Otol. 67
—— ——, pathological report, Otol. 67
—— ——, treatment suggested, Otol. 68
—— molluscum, three cases (G. W. Sequeira), Derm. 82
—— ——, treatment by thyroid extract, Derm. 83
——, nasal (of right fossa), with specimen and microscopic section (L. H. Pegler), Laryng. 10
——, nasopharyngeal, with mouth-breathing, deafness absent, Otol. 32
Fibromyoma of uterus, treatment by total abdominal hysterectomy, Obst. 57
Fibro-papilloma of larynx simulating laryngeal tuberculosis, pendulous epiglottis, removal of growth by snare and forceps (J. Dundas Grant), Laryng. 64
—— of trachea, removal by external operation, recovery (Sir William Milligan), Laryng. 52
Fibrosarcoma, case of (A. L. Macleod), Laryng. 56
"Fibrosarcoma" of nasopharynx (Norman Patterson), Laryng. 80
Fibrosarcomata grouped in peculiar manner on chest, case (E. G. Graham Little), Derm. 41
Fibrous tissue, absorption under heliotherapy, Electr. 11
Field sanitation in prevention of dysentery, Epid. 8
Fieldholme water, Cheltenham, composition, Baln. 2
FILIPPI, Cav. FILIPPO DE, Hon. K.C.I.E.—On some special problems of the Italian Medical War Services, Epid. 40-60
Fingers, flexor spasm of, hysterical, R.S.M. Discussion, 3
——, "local syncope" of, Derm. 20
——, tonic spasm of, following penetrating wound of forearm, R.S.M. Discussion, 17
Finlaison, value of morbidity records, quoted, Epid. 140
Fixation-abscesses in painful amputation stumps, R.S.M. Lect. 23
Flap operation to fill in depressed scar following mastoid operation, Otol. 56
Flatulency in cases of gastro-intestinal sepsis, Otol. 16
Fleas, species of, spreading plague in India, Epid. 129
——, transmission of plague by, Epid. 89, 98, 106, 108, 112

Flesh-fly, larva of, in ear (E. B. Waggett), Otol. 14
Fletcher, H. Morley.—Chronic fibrosis of kidneys associated with infantilism in children, quoted, Child. 25
——, discussion on "botulism," Child. 51, 53
—— —— on case for diagnosis, Child. 13, 14
—— —— —— of amaurosis following violent convulsions, Child. 15
—— —— —— of osteomalacia and infantilism, Child. 24
—— —— on treatment of three cases of melæna neonatorum, Child. 8
Flexner's bacillus as cause of dysentery, Epid. 5
Flexor contracture, hysterical, R.S.M. Discussion, 3
—— spasm of fingers, hysterical, R.S.M. Discussion, 3
Flushing of face in "twilight sleep" in childbirth, Obst. 11, 30
Fly activity, causal factor of dysentery in Eastern campaigns, Epid. 4
Folliculitis, artificial production in Russian Jews to avoid military service, Derm. 83, 84
—— in soldiers from wearing dirty caps, Derm. 52, 53
Food absorbed, energy value of, Epid. 62
—— consumed, energy value in relation to rationing, Epid. 69, 70
—— deficiencies, diseases due to, in Eastern campaigns, Epid. 25
—— economy, protection of sedentary workers from cold in relation to, Epid. 71
—— irritating and badly cooked, predisposing to dysentery, Epid. 8
—— problem, epidemiological study of (M. Greenwood and C. M. Thompson), Epid. 61-84
—— ration of British Army, calorie allowance, Epid. 56
—— —— —— ——, training at home, Epid. 59
—— rationing, energy value of food consumed in relation to, Epid. 69, 70
—— —— in England in middle ages, Epid. 73
—— rations in Italian army, calorie value, Epid. 55, 56, 57
—— requirements of sedentary worker, effect of exposure to cold and wind on, Epid. 71
—— shortage, consequences of, Epid. 73
—— ——, psychological aspect, Epid. 83, 84
—— waste in British army in early stages of the war, Epid. 59
—— —— —— ——, prevention, Epid. 54
Foodstuffs, specific energy of, Rubner's theory, Epid. 62
Foot and leg, muscular atrophy specially affecting, in post-central lesions, Neur. 22
—— drop due to injury of sciatic nerve by gunshot wound, Derm. 48
——, inversion of, tonic spasm following injury causing, R.S.M. Discussion, 16
—— key, new, for gas cylinders (O. Millauro), Anæsth. 28
——, trophic ulceration of, after gunshot wound, case (E. G. Graham Little), Derm. 47
Foramen cæcum. discovery of, by Morgagni (Charles Greene Cumston), Hist. 49
—— ——, researches of Bochdalek on, Hist. 49
Forceps, Citelli's, for removal of growths from ethmoidal labyrinth, Laryng. 33
—— deliveries under "twilight sleep," Obst. 34, 35, 36, 43
—— for removal of foreign bodies impacted in lungs, Odont. 110, 111
——, Irwin Moore's, in removal of mutton-bone from entrance to œsophagus, Laryng. 52
——, laryngeal, in removal of papilloma of larynx, Laryng. 64, 65
—— (tonsil artery), (Dan McKenzie), Laryng. 137
Forearm, penetrating wound of, followed by tonic spasm of fingers, R.S.M. Discussion, 17
Foreign bodies impacted in air passages, removal under bronchoscopy, results, Odont. 108
—— —— —— in lungs, cause death if not removed, Odont. 110
—— —— —— ——, removal, forceps for, Odont. 110, 111
—— —— in amputation neuromata, results of, R.S.M. Lect. 6
—— ——, irritation round, causing pain in amputation stumps, R.S.M. Lect. 15
—— body (Brazil nut shell) in trachea (F. A. Rose), Laryng. 129
—— —— (collar stud) impacted between vocal cords, causing death, Laryng. 72
—— —— —— ——, in left bronchus of child, producing collapse of lung of one year's duration (J. Dundas Grant), Laryng. 71

Foreign body (duck bone and flesh) impacted in œsophagus, removal of (G. C. Cathcart), Laryng. 83
—— —— (green pea) removed from middle ear by post-aural operation (H. J. Bauks Davis), Otol. 7
—— —— (hair-ball) in stomach (R. Mortnn), Electr. 15
—— —— (larva of flesh-fly) in ear (E. B. Waggett), Otol. 7
—— —— (mutton-bone) in œsophagus, removal (Sir W. Milligan), Laryng. 52
Formol, spraying with, destruction of lice by, Epid. 35, 36
Fossa, nasal, right, fibroma of, case, with specimen and microscopic section (L. H. Pegler), Laryng, 10
Fox, H. Clayton.—Discussion on case of nasal fibroma (of right fossa), Laryng. 11
——, discussion on cases of tuberculosis of larynx, Laryng. 18
Fox, R. Fortescue.—Discussion on mineral waters and climate of Cheltenham, Baln. 7
Fox, R. Hingston.—A budget of post-mortem reports, 1813-1821: Dr. Matthew Baillie's foundation work in morbid anatomy (abstract), Hist. 79
Fox, T. Colcott, gyrate erythema, quoted, Derm. 2
Fractures, compound, at the Front, treatment by primary suture, percentage of successful cases, R.S.M. Lect. 2, 3
——, extensive, of lower jaw, splints combined with sutures through bone for immobilization of (V. H. Kazanjian), Odont. 67
—— of mandible and maxilla, Odont. 22
—— ——, treatment, Odont. 19
—— —— ——, principles (C. H. Bubb), Odont. 27
—— ——, ununited, treatment of, operative (Percival P. Cole), Odont. 38
—— ——, with considerable loss of tissue, Odont. 40
—— of maxilla, treatment, Odont. 21
Fragilitas ossium, see *Osteogenesis imperfecta*
France, outbreaks of dysentery in, due to various bacteria, Epid. 5
——, surgeons of, see *Confraternity*
——, trench fever in, Epid. 20 ; see also *Army*, French
French, J. Gay.—Case of gunshot wound of larynx, Laryng. 176
——, case of orbital tumour, Laryng. 115
Fresh-water bathing, inhibition, except in disinfected pools in prophylaxis against bilharzia, Epid. 24
Freud, cause of developed dread in situations of real danger suggested by, Psych. 35
——, ego ideal of, Psych. 26
——, object of construction of psycho-neurotic symptoms, quoted, Psych. 33
——, source of neuroses, Psych. 26
——, theory of, in regard to neuroses and war shock (Ernest Jones), Psych. 21
—— —— of neuroses, Psych. 19, 20
——, views on repression, Psych. 18
Frontal bone, left, osteoma of (Hunter Tod), Laryng. 74
—— sinus and tympanum, path of infection between, Otol. 31
—— ——, intranasal operation on, under nitrous oxide anæsthesia (Dau McKenzie), Laryng. 137
—— ——, left, and ethmoid, mucocele of, Laryng. 115
—— ——, suppuration of; suppurative meningitis for fourteen days; operation, recovery (W. M. Mollison), Laryng. 111
Fronto-nasal canal and Eustachian tube, path of infection between, Otol. 31
Fruit, electro-motive force in, Electr. 27
——, galvanometer experiments with, Electr. 27
Fry, W. Kelsey, and Hett, G. S.—Case of total loss of hard palate and exposure of the antral cavities in the mouth, Laryng. 90
Fuchs, earliest stages of infection of vitreous body, Ophth. 4
Fumigation treatment of syphilis, early work on, Hist. 58

Fundus oculi, direct observation of, during period of temporary blindness (A. W. Ormond), Ophth. 5
Furuncle of meatus mistaken for acute mastoiditis, Otol. 55

Gairdner, Sir W., aphasia in relation to testamentary capacity, quoted, Neur. 17
Gaiter pain fever, Epid. 19 ; see also *Trench fever*
Galippe, penetration of dentine by fungus, Odont. 99
Gallipoli Peninsula, beri-beri at, Epid. 26
—— ——, camp jaundice at, Epid. 11, 12
—— ——, outbreak of dysentery at, Epid, 2, 3, 4
—— ——, prevalence of enterica at (1915), Epid. 9, 10
—— —— —— of paratyphoid at, considerable, Epid. 11
—— ——, sandfly fever at, Epid. 22
GALLOWAY, Sir JAMES, K.B.E., C.B.—Discussion on cases for diagnosis, Derm. 49, 73, 104, 110
——, discussion on case for diagnosis, possibly early case of miscalled multiple, idiopathic, hæmorrhagic sarcoma of Kaposi, Derm. 110
—— —— —— of extensive dermatitis, Derm. 47
—— —— —— of guttate morphœa, Derm. 96
—— —— —— of Hodgkin's disease with prurigo, Derm. 91, 92
—— —— —— of lupus erythematosus of unusual type, Derm. 76
—— —— —— of mycosis fungoides, Derm. 94
—— —— —— of prurigo diathésique de Besnier, Derm. 68
—— —— —— of pruritus in Hodgkin's disease, Derm. 70
—— —— on multiple erythema perstans, Derm. 114
—— —— —— rodent ulcer with X-ray burns, Derm. 44
—— —— on trophic ulceration of foot after gunshot wound, Derm. 48
—— —— on (?) tumour of parotids involving skin, Derm. 75
——, punctate keratosis of the palms of the hands and soles of the feet, two cases occurring in cousins-german, with histological and bibliographical notes, by H. G. Adamson, Derm. 85-90
Gall-stones charged with radium introduced into gall-bladder of rats to produce carcinoma, Path. 3
——, from cases of primary carcinoma of gall-bladder, containing radium, Path. 1
Galvanic and faradic currents combined, in production of contractions in muscles with injured nerve-supply, Electr. 31
—— current, continuous, application in morphœa guttata, Derm. 27
Galvanism in removal of fibrous tissue surrounding nerve, Electr. 35
——, surging, production of contraction of paralysed muscles by, Elect. 34
Galvano-cautery and diathermy, respective actions contrasted, Electr. 37, 38
—— and sanatorium silence, extensive tuberculosis of larynx completely cicatrized by (Sir StClair Thomson), Laryng. 16
——, application in symmetrical nodules of vocal cords, Laryng, 117, 118
—— in treatment of tuberculosis of larynx (Sir StClair Thomson), Laryng. 15
Galvanometer, d'Arsonval, readings by, effect of contact currents on, Electr. 28
—— deflexion experiments with fruit, leaves, and vegetables, Electr. 26, 27
—— deflexions, absent in case of cut or damaged nerves, Electr. 24, 28
—— ——, effect of moisture on, Electr. 25, 27, 28
—— ——, estimating current led off from human body, Electr. 24, 27, 28
—— —— in anæmia, Electr. 25, 27
—— —— in neurasthenia, Electr. 27
—— —— in shell shock, Electr. 25, 27
——, Kelvin astatic, readings by, effect of contact currents on, Elect. 28
GARDNER, H. BELLAMY.—Discussion on administration of anæsthetics in home military hospitals, Anæsth. 10

GARDNER, H. BELLAMY.—Discussion on tooth impacted in secondary bronchus, Odont. 111

Gardner, J. A., and Buckmaster, G. A., analyses of blood gases during chloroform anæsthesia, quoted, Anæsth. 16

Garrod, Sir A. E., K.C.M.G., F.R.S., congenital heart disease in Mongoloid idiots, quoted, Child. 5

Gas, asphyxiating, victims among Italian troops at Front, Epid. 44

—— gangrene, contra-indication for closure of wounds, R.S.M. Lect. 2

Gassing, action on larynx, Laryng. 195

——, changes in pharynx and larynx following, Laryng. 188

Gastro-enteritis in T.N.T. workers, Epid. 167

Gastro-intestinal disturbances, prevalence during famines, Epid. 83

Gauss, introduction of term "twilight sleep" by, Obst. 4

GAUVAIN, H. G.—Heliotherapy and X-rays in the treatment of surgical tuberculosis, Electr. 9

Gauze-seton, insertion through skin of amputation stump to relieve pain, R.S.M. Lect. 23

Geiger's electric motor, Odont. 39

Gel formation of colloidal material in marsupial enamel, Odont. 51, 52, 65

General hospitals, treatment of jaw injury cases in, Odont. 6

General Lying-in Hospital, York Road, S.E., report on twenty cases of "twilight sleep" in childbirth at, Obst. 29

Genu varum, case of osteomalacia ("boomerang" bones), manifested by, Path. 44-46

German school of metabolism, rationing systems of European armies based on, Epid. 40, 41; see also *Army*, German

Giardia (*Lamblia*) *intestinalis* in human dysenteric fæces, periodic rhythm in number present, M.B.L. 2

GIBBONS, R. A.—Discussion on undiagnosed cancer of uterus complicating myoma treated by total hysterectomy, Obst. 57

Giddiness, conditions under which relieved by operations on nose, Otol. 41

Giles, A. E., after-results of abdominal operations, quoted, Obst. 55

GILLIES, H. D.—Demonstration on rhinoplasty, Laryng. 87

——, discussion on administration of anæsthetics in home military hospitals, Anæsth. 11

Gloster, Major, and White, Major, spread of plague in United Provinces of India, quoted, Epid. 113

Glottis, stenosis of, from combination of tuberculosis and syphilis, requiring tracheotomy, cases (Sir StClair Thomson), Laryng. 76, 77

——, width of, Laryng. 143, 144

Gloves, little used by workers in tri-nitro-tolnene, Epid. 156

Glucose, conversion of glycocoll and alanin into, in diabetic organism, Epid. 63

——, substitution for protein in diet, Epid. 63

Glycocoll, conversion into glucose in diabetic organism, Epid. 63

Glycosuria, benefited by Cheltenham waters, Baln. 3, 5

GOADBY, Sir KENNETH, K.B.E.—Muscle contracture following injury, R.S.M. Discussion, 11

Godlee, Sir Rickman J., torus palatinus, quoted, Laryng. 135

GOLDSMITH, G. HARVEY.—Coloboma of optic disk and choroid, Ophth. 10

GOLDSMITH, P. G.—Discussion on case of cholesteatoma exposing lateral sinus, Otol. 11

——, discussion of case of epithelioma of ethmoidal labyrinth, lateral rhinotomy, Laryng. 32

—— —— on cystic tumour of epiglottis, Laryng. 79

—— —— on gastro-intestinal sepsis as cause of Ménière's symptoms, Otol. 19

—— —— on illustrations of nasal endo-rhinoscopy, Laryng. 51

—— —— on influence of diseases and abnormalities of nose on ear, Otol. 39

—— —— on osteoma of left frontal bone, Laryng. 75

—— —— on war injury of ear, Otol. 9

GOLLA, F. C.—Muscle contracture following injury, R.S.M. Discussion 6, 19

Goodey, enumeration of soil protozoa, quoted, M.B.L. 3

Grafting in war injuries of jaw, suitability of cases for, Odont. 4

Grant, J. Dundas.—Case of chronic suppuration of the middle ear and cholesteatoma treated by radical mastoid operation with retention of the cholesteatoma matrix, Otol. 77
——, case of fibro-papilloma of larynx simulating laryngeal tuberculosis in a middle-aged soldier; pendulous epiglottis; removal of growth by means of snare and forceps, Laryng. 64
—— —— of foreign body (collar stud) in left bronchus of a child, producing collapse of lung of a year's duration, Laryng. 71
—— —— of multiple papillomata of the larynx in a child; tracheotomy and removal under suspension laryngoscopy; decanulization; subsequent recurrence of a stridor; re-introduction of tube; larynx found almost clear by indirect laryngoscopy; tentative removal of tube, Laryng. 66
—— —— of pre-tracheal abscess of acute development, in a middle-aged woman, producing dysphagia and dyspnœa, Laryng. 72
—— —— of tuberculosis of the larynx in a female patient; dyspnœa and regurgitation of liquids during drinking relieved by intralaryngeal operation, Laryng. 63
——, discussion on case of extreme alar collapse, Laryng. 130
—— —— —— of fibro-papilloma of trachea, Laryng. 53
—— —— on gastro-intestinal sepsis, as cause of Ménière's symptoms, Otol. 22
—— —— on illustrations of nasal endorhinoscopy (epidiascope), Laryng. 51
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 38
Granuloma annulare, association of rheumatism with, Derm. 32
—— ——, cases (E. G. Graham Little), Derm. 92
—— —— —— (J. M. H. MacLeod), Derm. 31
Gray, A. A.—Discussion on case of aural fibroma, Otol. 68
——, discussion on case of concentric narrowing of meatus, Otol. 66
—— —— on gastro-intestinal sepsis as cause of Ménière's symptoms, Otol. 19
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 33
—— —— on parotid fistula of twelve months' duration, Otol. 55
Gray, A. M. H.—Discussion on case of granuloma annulare, Derm. 31
——, discussion on case of miliary syphilide, Derm. 100
—— —— —— of persistent erythema, Derm. 60
—— —— —— of rodent ulcer treated by radium, Derm. 63
—— —— —— of ulcus molle serpiginosum, Derm. 22
—— —— on cases for diagnosis, Derm. 59, 65, 72, 84
—— —— on syphilitic rash appearing after twenty-three injections of novarsenobillon, Derm. 79
—— —— on (?) tumour of parotids involving skin, Derm. 74
—— —— on two cases of morphœa guttata, Derm. 27
Greenough, removal of bone-fragments in fractures, quoted, Odont. 29
Greenwood, M.—Discussion on the incidence of industrial tuberculosis, Epid. 142
——, discussion on theory of epidemiology in relation to plague, Epid. 128
——, relation between plague in man and plague in the rat, quoted, Epid. 110
——, and Thompson, Miss C. M.—An epidemiological study of the food problem, Epid. 61
Greenwood, W. Osborne.—Discussion on scopolamine-morphine narcosis in childbirth, Obst. 41
Groves, E. W. Hey, bone-fragments in comminuted fractures, quoted, Odont. 29
Gruel, calorie values in, diet at Millbank Penitentiary, Epid. 78, 79, 80
Gunners, naval and military, effect of nasal obstruction in, on equilibration, Otol. 2
Gunshot injuries, disruptive action and tunnelling, contrast between, Path. 68
—— —— ——, phenomena in (S. G. Shattock, F.R.S.), Path. 47-118
—— ——, compound nature, Path. 48
—— —— of bladder, Path. 104, 105
—— —— of colon, disruptive phenomena, Path. 100, 101
—— —— of kidney, Path. 80, 81
—— —— of lung, with absence of disruptive effect, Path. 83, 84, 85

Gunshot injuries of nose, loss of three main elements of nose in, Laryng. 87
—— —— of rectum, disruptive phenomena, Path. 99, 100
—— —— of small intestine, Path. 94-99
—— —— of solid viscera, Path. 51
—— —— of spleen, Path. 80
—— ——, velocity of missile in, Path. 48
—— wound, foot-drop due to injury of sciatic nerve by, Derm. 48
—— —— of lung, minimal, causing septic hæmothorax, ending fatally, Path. 73
—— —— of Meckel's diverticulum, double penetrating, Path. 99
—— —— of renal pelvis, perforating, Path. 107, 108
—— —— of testicle, perforating, Path. 117
—— ——, trophic ulceration of foot after, case (E. G. Graham Little), Derm. 47
—— wounds of arteries, Path. 73, 74
—— —— ——, minimal. Path. 74-76
—— —— of bladder, minimal, Path. 78
—— —— of heart, minimal, Path. 72
—— —— of knee-joint. minimal, Path. 79
—— —— of larynx, cases (J. Gay French), Laryng. 176
—— —— —— —— (W. Douglas Harmer), Laryng. 176
—— —— —— —— (E. A. Peters), Laryng. 177
—— —— —— —— (H. Tod), Laryng. 176
—— —— —— ——, perforating, Path. 89
—— —— of liver, minimal, Path. 69
—— —— of nose, advancement of turbinals and septal swings in, cases (G. S. Hett), Laryng. 99-108
—— —— of œsophagus, bilateral, perforating, Path. 90
—— —— of skin, minimal, Path. 79
—— —— of spleen, minimal, Path. 72
—— —— of stomach, double, perforating, Path. 91, 92
—— —— ——, minimal, Path. 78
—— —— of trachea, perforating, Path. 89
GUTHRIE, LEONARD.—Muscular atrophy and other changes in nutrition associated with lesions of the brain, with especial reference to the possible existence of trophic representation in the post-central areas, Neur. 21
Gwathmey's rectal oil-ether method in plastic face surgery, Anæsth. 9, 11, 12
Gymnastic and remedial exercises in treatment of functional nervous disorders in soldiers, Neur. 48

Hæmangioma hyperplasticum, tumour on back of child resembling, Path. 27
Hæmocytometer in enumeration of protozoa, M.B.L. 2, 3
Hæmoglobin and chloroform, aggregations outside body, Anæsth. 25
Hæmophilia and purpura. coagulation of blood in (W. Palmer Lucas), Child. 42
——, case (E. Pritchard), Child. 37
—— ——, pedigree illustrating family history, Child. 37
——, diphtheria in subject of, Child. 32
——, family history of, Child. 32
—— treatment by application of coagulose, Child. 8, 9
—— with effusion into knee-joints, case (Paul B. Roth), Child. 29, 40, 41
—— —— —— ——, diagnosis, Child. 30
—— —— —— ——, prognosis, Child. 31
—— —— —— ——, treatment, proposals and suggestions, Child. 31, 32
Hæmoptysis following gunshot wounds of larynx, Laryng. 180
Hæmorrhage complicating diathermy of malignant growths, Electr. 40, 41, 44, 45, 48
—— during third stage of labour under "twilight sleep," Obst. 35, 39

Hæmorrhage, fatal, following operation for cancer of fauces, Laryng. 131

—— following gunshot wounds of larynx, Laryng. 180

——, post partum, following labour induced by "twilight sleep," Obst. 21, 22

——, uterine, fatal, in T.N.T. worker, wrongly ascribed to abortion, Epid. 157, 158

Hæmorrhages, cutaneous, of septicæmia and leukæmia in T.N.T. workers, wrongly ascribed to T.N.T. poisoning, Epid. 157

Hæmothorax, septic, ending fatally, due to minimal gunshot wound of lung, Path. 73

Hair-ball in stomach (R. Morton), Electr. 15

Hair follicles, microscopical examination in case of keratosis follicularis, Derm. 36, 37

Hall, John, Shakespeare's medical son-in-law (R. W. Leftwich), Hist. 77

Halle, John (1529-68) and sixteenth century consultations (D'Arcy Power), Hist. 55

——, biographical facts relating to, Hist. 55

——, relations with Vicary, Hist. 56

——, religious verses by, Hist. 64

——, translation of Nicolaus Massa's work on treatment of syphilis by fumigation, Hist. 58

——, works of, Hist. 55, 56

Hamilton bandage, application where maxilla has been wrenched from bony base, Odont. 21

Hand, affected, in parietal lesion resulting from bullet wound, profound "feminine" appearance in, with hypotonia, Neurol. 27

—— and forearm, muscular atrophy specially affecting, in post-central lesions, Neur. 22

Hands and feet, tuberculosis of, X-ray treatment, application must be limited, Electr. 12

——, involvement in nutritional changes, following injuries to posterior part of cervical enlargement of spinal cord, Neur. 36

——, palms of, and soles of feet, punctate keratosis of; two cases occurring in cousins-german (Sir James Galloway and H. G. Adamson), Derm. 85-90

Harless, changes in form of red blood corpuscles, quoted, Anæsth. 23

HARMER, W. DOUGLAS.—Case of double dacryocystitis, Laryng. 171

——, cases of gunshot wound of larynx, Laryng. 176

——, crossing of arytænoids, Laryng. 171

——, discussion on cancer of larynx, Laryng. 128

—— —— on case of carcinoma of fauces, treated by per-oral excision, followed by diathermy, Laryng. 132

—— —— —— of thyroid tumour at base of tongue, Laryng. 155

—— —— —— of transplantation of cartilage into septum, Laryng. 140

—— —— on large submaxillary calculus, Laryng. 157

—— —— on paralysis of arytænoideus, Laryng. 165

—— —— on saddle-back nose, resulting from resection of septum, Laryng. 20

—— —— on warfare injuries and neuroses of larynx, Laryng. 180, 199

——, epidiascope demonstration of specimens from cases of warfare injuries of larynx, Laryng. 173

—— and STEVENSON, A. C.—Colony of actinomyces in the crypt of a tonsil, Laryng. 161

HARRIS, WILFRED.—Muscle contracture following injury, R.S.M. Discussion 15

—— —— —— —— —— (demonstration of cases), R.S.M. Discussion 2

——, note on case of foot-drop due to injury of sciatic nerve by gunshot wound, quoted, Derm. 47, 48

HASTINGS, SOMERVILLE.—Case of cholesteatoma exposing the lateral sinus, Otol. 10

——, discussion on aural bacteræmia, Otol. 53

—— —— on case of orchitis and deafness, Otol. 80

—— —— on depressed scar following mastoid operation, Otol. 56

—— —— on operation on mastoid for acute suppurative inflammation followed by insertion of B.I.P., Otol. 73

HAYTON, C. H.—Calculus of tonsil, Laryng. 113

Hayward splint, application where maxilla has been wrenched from bony base, Odont. 22

HEAD, HENRY, F.R.S.—Cases of wounds of the nervous system, Neur. 27

——, imperception combined with defect of speech, quoted, Neur. 7

HEAD, HENRY, F.R.S.—Nature of speech function, quoted, Neur. 2
——, trophic functions of spinal ganglia, quoted, Neur. 26
——, and Thompson, T., association of spinal posterior columns with tract of cerebellum, quoted, Neur. 32
HEAD, H. C.—A mobile X-ray wagon unit, Electr. 56
Health resorts, development, guiding principles for, Baln. 7, 8
—— ——, special individuality of, Baln. 8
Hearing, impairment, rare in anterior nasal stenosis due to syphilis, Otol. 28
——, loss of, due to delay in operating in acute and subacute suppurative otitis media (R. Lake), Otol. 60
—— ——, in war injury case, Otol. 8, 9
—— —— —— —— ——, prognosis, Otol. 9
——, slight affection of, in nasal obstruction, Otol. 33
——, testing of, before operations on nose in cases of deafness, Otol. 39, 40, 45
—— tests, result of, in airman with aural vertigo and unilateral obstruction of Eustachian tube without deafness, Otol. 22
—— ——, scheme formulated by Committee of Otological Research, Otol. 4, 5
——, tuning-fork tests for, Otol. 5
Heart, dilatation, accompanying gastro-intestinal sepsis, Otol. 16
—— ——, common cause of, Otol. 16
—— ——, diagnosis, Otol. 16
—— disease, congenital, case (Eric Pritchard), Child. 39
—— —— ——, in mentally defective child with negroid-mongoloid facies (F. Parkes Weber), Child. 3
—— —— —— —— —— —— —— ——, accompanied by xerodermia, Child. 4
—— —— ——, ? patent ductus arteriosus (J. Porter Parkinson), Child. 38
—— ——, effect of "twilight sleep" in cases of, Obst. 27
—— —— in cases of aphasia with mental disorder, percentage in both sexes, Neur. 5
—— ——, morphia contra-indicated in cases of, Anæsth. 6
——, failure of auricular fibrillation, comparative value of digitalis series of remedies in (A. J. Whiting), Therap. 1-52
——, fœtal, effects of "twilight sleep" upon, Obst. 12
——, gunshot injuries of, Path. 108-110
—— —— wounds of, minimal, Path. 72
—— muscle, degeneration in soldiers found post mortem, coinciding with appearances of sepsis, Anæsth. 2
—— ——, fibrillation, cause of death under chloroform narcosis, Anæsth. 28
—— —— of soldiers, effect of malaria on, Anæsth. 2
—— —— ——, effect of prolonged suppuration on, Anæsth. 2
——, size of, method of determining, Otol. 16
Heat, moist, application to muscles with injured nerve-supply, Electr. 31
HEATH, CHARLES.—Discussion on influence of diseases and abnormalities of nose on ear, Otol. 34
Hehir, Colonel I.M.S., report on siege of Kut-el-Amara, quoted, Epid. 76
Heliotherapy in treatment of surgical tuberculosis (H. J. Gauvain), Electr. 9
——, constitutional effects, Electr. 11
—— in surgical tuberculosis, benefits resulting from, Electr. 11
—— —— ——, contra-indications, Electr. 11
——, pigmentation under, Electr. 10
Hemianopia, partial, as result of wound, with considerable power of appreciating movement, but not stationary objects, case, Neur. 27
Hemiplegia, apraxia and agraphia without definite, Neur. 12, 14
——, cause of rigidity of affected limbs in, Neur. 32
—— in cases of aphasia, with mental disorder, Neur. 5
——, infantile or congenital, of cerebral origin, Neur. 25

Henry II, of France, death of, with rare engraving of event (C. G. Cumston), Hist. 51
HEPBURN, MALCOLM L.—Old choroidal scar with fibrous band stretching from it to the disk, Ophth. 8
Hereditary predisposition as factor in causation of a neurosis, Psych. 31, 32
HERN, WILLIAM.—Discussion on tooth impacted in secondary bronchus, Odont. 111
——, discussion on work at a jaw injuries centre, Odont. 25
HERNAMAN-JOHNSON, F.—Discussion on electrical treatment of war wounds and scar tissue, Electr. 54
——, discussion on electro-physiological phenomena. Electr. 27
—— —— on surgical diathermy, Electr. 46
—— —— on treatment of injury to peripheral nerves, Electr. 35
—— —— on X-rays in treatment of nævus, Electr. 14
Hernia cerebri, following cerebral abscess; avulsion of abscess wall; complete homolateral ophthalmoplegia; recovery (W. M. Mollison), Otol. 61
Herpes zoster, accompanying disease of spinal ganglia, Neur. 26
——, recurrent, of auricle, in boy (H. J. Banks Davis), Otol. 53
HETT, G. S.—Case of sunken-in nose, illustrating the employment of an autogenous costal cartilage graft for septal support, Laryng. 96
——, case of total loss of nose, illustrating the method of advancement of the turbinals, Laryng. 94
——, notes on a case of post-traumatic laryngeal stenosis treated by homologous cartilage graft, Laryng. 97
——, shrapnel wound of the left side of the face, Laryng. 95
——, turbinal shifts and septal swings, Laryng. 99
——, and FRY, W. KELSEY.—Case of total loss of hard palate and exposure of the antral cavities in the mouth, Laryng. 90
Higden, food rationing and famines in Middle Ages in England, quoted, Epid. 73, 74
Hill, A. Bertram, congenital abnormalities in cases of Mongolism, quoted, Child. 5
HILL, WILLIAM.—Discussion on cancer of larynx, Laryng. 128
——, discussion on case of cholesteatoma exposing lateral sinus, Otol. 10
—— —— —— of complete paresis of left vocal cord due to mediastinal growth, Laryng. 50
—— —— —— of epithelioma of left vocal cord, Laryng. 9
—— —— —— of fibro-papilloma of trachea, Laryng. 53
—— —— —— of hyper-adduction of left arytænoid cartilage, Laryng. 12
—— —— —— of nasal fibroma of right fossa, Laryng. 11
—— —— —— of primary carcinoma of naso-pharynx, Laryng. 5
—— —— —— of tuberculosis of larynx, Laryng. 64
—— —— on epithelioma of larynx, Laryng. 14
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 25
—— —— on lupoid tuberculosis, Laryng. 5
—— —— on multiple papillomata of larynx in child, Laryng. 67
—— —— on multiple papillomata of larynx; tracheotomy and removal under suspension laryngoscopy, Laryng. 67
—— —— on naso-antral polypi, Laryng. 126
—— —— on saddle-back nose consequent on resection of septum, Laryng. 21
—— —— on sarcoma of antrum, Laryng. 36
—— —— on surgical diathermy, Electr. 43
—— —— on treatment by diathermy of extensive epithelioma, Laryng. 23
——, extreme alar collapse, Laryng. 129
——, pharyngeal pouch treated by diverticulo-pexy, Laryng. 60
——, and PATTERSON, NORMAN.—Carcinoma of fauces treated by per-oral excision, followed by diathermy, Laryng. 130
Hip-joints (both) and temporo-maxillary joint, left congenital malformation of (A. S. Blundell Bankart), Child. 16
HIRSCH, C. T. W.—Combined gas, oxygen, ether and warmed ether apparatus, Anæsth. 29

HIRSCH, C. T. W.—Discussion on physiology of anæsthesia by chloroform, Anæsth. 27
Hoarseness in professional singer, due to operation scar, radium treatment, Laryng. 189, 190
Hodgkin's disease, pruritus in (lymphogranulomatosis pruriginosa) (F. Parkes Weber and P. W. Dove), Derm. 68
—— ——, with prurigo, case (J. M. H. MacLeod), Derm. 91
Hoffmann, statistics of foreign bodies aspirated into lungs, Odont. 109
Holmes, Gordon, nerve-conduction of trophic influence, quoted, Neur. 26
Holmes's blood-clot dressing, application after mastoid operations, Otol. 3
Hong-Kong, plague epidemics (1893-1904), correlation between β_1 and total number of deaths, Epid. 110
—— —— ——, values of β_1 and β_2 (symmetry and asymmetry and form of curves) for, Epid. 92
HOPSON, MONTAGU F.—Discussion on tubular enamel of marsupials, Odont. 65
HORNE, W. JOBSON.—Case of tuberculosis of larynx, Laryng. 86
——, cyst of the epiglottis of unusual size, Laryng. 79
——, discussion on aural bacteræmia, Otol. 49
—— —— on case of chronic suppuration of middle ear and cholesteatoma treated by radical mastoid operation, Otol. 78
—— —— —— of hyper-adduction of left arytænoid cartilage, Laryng. 12
—— —— —— of trichotillomania, with delusions of nasal origin, Laryng. 167
—— —— on cases of tuberculosis of larynx, Laryng. 18
—— —— on epithelioma of larynx, Laryng. 14
—— —— on fusiform dilatation of œsophagus, Laryng. 31
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 40
—— —— on lupoid tuberculosis, Laryng. 5, 6
—— —— on naso-antral polypi, Laryng. 126
—— —— on operation on mastoid for acute suppurative inflammation followed by insertion of B.I.P., Otol. 72
—— —— on paralysis of arytænoideus, Laryng. 164
—— —— on perichondritis of larynx, Laryng. 133
—— —— on saddle-back nose consequent on resection of septum, Laryng. 22
—— —— on symmetrical ulceration of vocal cords, Laryng. 117
—— —— on tonsil artery forceps, Laryng. 138
——, larynx with a cystic tumour of the epiglottis, Laryng. 79
——, microscopic section from the case of a tumour of the epiglottis, Laryng. 139
——, nasal obstruction in children, quoted, Otol. 29
——, tumour of the epiglottis, Laryng. 114
Horns, cutaneous, in lupus vulgaris, case (W. K. Sibley), Derm. 54
Horses, local tetanus in, R.S.M. Discussion, 18
Hospital accommodation inadequate, cause of spread of typhus fever in Serbia, Epid. 33
Hospitals for treatment of war injuries of jaw, proper organization of, Odont. 4
——, general, soldiers treated for functional nervous disorders unfit for active military duty on discharge from, Neur. 44
——, Serbian, sick wards of, sulphur fumigation in, Epid. 35
——, special, for treatment of functional nervous disorders in soldiers, Odont. 44
—— —— —— —— —— —— ——, necessity for resident medical officer, Neur. 45, 46
HOVELL, T. MARK.—Discussion on aural bacteræmia, Otol. 49
——, discussion on case for diagnosis, Laryng. 24, 171
—— —— on chronic suppuration of middle car and cholesteatoma treated by radical mastoid operation, Otol. 78
—— —— on fusiform dilatation of œsophagus, Laryng. 30
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 37
—— —— on naso-antral polypi, Laryng. 126
—— —— on warfare injuries and neuroses of larynx, Laryng. 192, 194
——, gastro-intestinal sepsis, a cause of Ménière's symptoms, Otol. 15

Howard, psychological aspect of food shortage, quoted, Epid. 84

Howarth, W. G.—Case of complete laryngectomy, Laryng. 54

——, discussion on case of orbital tumour, Laryng. 115

—— —— on lupoid tuberculosis, Laryng. 5

—— —— on thyroid tumour at base of tongue, Laryng. 154

Howell, C. M. Hinds.—Muscle contracture following injury, R.S.M. Discussion 18

Hudie, Simon, Hist. 56

Humidity, atmospherical, plague in relation to, Epid, 106, 107, 113, 128, 129

Humphreys, H. F.—Discussion on treatment of three cases of melæna neonatorum, Child. 9

Hunter, John, observation on absence of passage of stool after gunshot wound, Path. 101, 102

Hunter, William, C.B., steam disinfection appliances for destruction of lice devised by, Epid. 35

Hunter's canal, indication for exploration in painful nerve troubles after amputation of thigh, R.S.M. Lect. 20

—— ——, internal scar of amputation stump, filling up, R.S.M. Lect. 17

—— ——, passage up of irritative infective inflammation from amputation scar tissue, Electr. 52

Hurst, A. F.—Cinematograph demonstration of war neuroses, Neur. 39

Hutchison, Robert.—Discussion on case of amauroses following violent convulsions, Child. 2

——, discussion on the coagulation of blood in purpura and hæmophilia, Child. 43

——, note on three cases of melæna neonatorum successfully treated by the injection of whole blood or blood serum, Child. 7

Huxham, John, pupil of Boerhaave, Hist. 15

Hyalitis accompanying changes in vitreous resulting from penetrating septic wounds, Ophth. 2

——, definition of, Ophth. 4

Hydrobromic acid in epileptiform cases of aural vertigo, Otol. 19, 20

Hyoscine, administration, dangers of, Obst. 43

——, injections of, in induction of "twilight sleep," Obst. 16, 27, 39, 40

Hypalgesia during "twilight sleep," Obst. 42

Hyperthermia and hypothermia in lesions of sensory cortex, Neur. 23

Hypotonia, muscular, and profound "feminine" appearance of affected hand in parietal lesion, resulting from bullet wound, case, Neur. 27

—— ——, in lesions of sensory cortex, Neur. 24

——, muscular, and changes in nutrition, associated with lesions of the posterior columns of spinal cord and of posterior roots (G. Riddoch), Neur. 31

—— ——, following lesion confined to posterior part of cord, effect on appreciation of changes in posture, Neur. 34, 35

—— ——, with injury to posterior spinal nerve roots, effect on sensation, Neur. 33, 34

Hysterectomy, abdominal, total and supravaginal, preservation of pelvic floor considered in relation to, Obst. 57

—— —— ——, in treatment of fibro-myomata of uterus, Obst. 57

—— —— —— —— of undiagnosed cancer of body of uterus complicating myoma (H. R. Spencer), Obst. 48

—— —— —— —— —— —— —— —— —— ——, cases, Obst. 48-53

—— ——, superiority of, over supravaginal amputation in undiagnosed cancer of body of uterus complicating myoma, Obst. 54

——, supravaginal (subtotal) advocacy of, in absence of cancer, Obst. 57, 58

Hysteria taking form of needless dread, Psych. 33

——, see also *Muscles*, contractures, hysterical; *Paraplegia*, hysterical

Hysterical disorders of vision, classes of, Ophth. 13

—— —— ——, diagnosis, Ophth, 14, 15

Hysterical disorders of vision, distinct from malingering, Ophth. 14, 15
—— —— ——, treatment, Ophth. 14-16
Hysterics, best mode of treatment for, Neur. 45
——, indolence of, Neur. 47

Ichthyosis, congenital, severe case of, photographs (J. H. Stowers), Derm. 7
—— hystrix linearis of palms (S. E. Dore), Derm. 99
Ideals, innate human, alteration by war, Psych. 25
Iliac vein, gunshot wound of, double perforating, Path. 115
—— ——, external, gunshot wound of, double perforating, Path. 116
Illness affecting prevalence of tuberculosis, Epid. 134
Imagination, disordered, a neurosis a disorder of, Psych. 33
Immobilization in war injuries of jaw, question of, Odont. 4
Imperception combined with defect of speech, Neur. 7
Impetigo of Bockhart of unusual extent and severity, case (E. G. Graham Little), Derm. 40
Implantation cyst of iris, case of (A. B. Roxburgh), Ophth. 10
—— —— ——, removal important, Ophth. 11
Incandescent lamp, high candle power, in treatment of inflamed and painful wounds, Electr. 54
India, famines in, type of sickness prevailing, Epid. 83
Indian troops in Mesopotamia, leishmania among, Epid. 25
—— —— —— on Tigris front, scurvy among, Epid. 27
Industrial classes, correlation between family income and energy value, Epid. 69
—— disease, notifications of, difficulty in, Epid. 165
—— —— ——, when made, Epid. 151
—— families, urban, daily amount of protein, fat and carbon consumed by, according to wages earned, Epid. 70
—— workers, diet of, number of calories required, Epid. 82
—— ——, various grades of, daily amount of protein, fat and carbohydrate consumed by, compared, Epid. 70
Industrialization, tuberculosis among women due to, Epid. 142
Infantile fixation in development as factor in causation of neurosis, Psych. 31, 32
Infantilism and osteomalacia, relation to delayed rickets, Child. 24
—— ——, with horseshoe kidney and interstitial nephritis, case (H. C. Cameron), Child. 22
—— in children, chronic fibrosis of kidneys associated with, Child. 25
Ingleby, Miss Helen.—Discussion on case of myotonia, Child, 59, 60
Inhalation spray chambers in prophylaxis of certain epidemics in young soldiers, Epid. 55
Insanity, pre-existing, aphasia supervening on, Neur. 19
Insolation, see *Heliotherapy*
Integraph, calculation of form of epidemic by, Epid. 121
Intestinal obstruction, inversion of uterus complicated by (O. Tilson Dinnick), Obst. 45
Intestine, motor inhibition, following injury, Path. 101, 102, 103
——, operations on, followed by tetanus, R.S.M. Discussion 21
——, rhythmic segmentation of, Path. 103
——, small, gunshot injuries of, Path. 94-99
—— —— —— ——, causing complete division, Path. 95
—— —— —— —— —— grazing or contusion, Path. 94
—— —— —— ——, followed by motor inhibition of whole intestinal canal, Path. 102
—— —— —— —— with disruptive phenomena, experiments demonstrating, Path. 96
—— —— —— wounds, double, perforating, Path. 94, 95
—— ——, injury of, followed by general inhibition of intestinal movement, experiment showing, Path. 103, 104
—— ——, movements of, how observable, Path. 102, 103
—— ——, shell fragment wounds of, Path. 97, 98

Intrabuccal film method in diagnosis of fractures of mandible, Odont. 28
Intracranial operations, anæsthetic suitable for, Anæsth. 7
Intralaryngeal operation relieving dyspnœa and regurgitation of liquids in tuberculosis of larynx (J. Dundas Grant), Laryng. 63
Intranasal frontal sinus operation under nitrous oxide anæsthesia (Dan McKenzie), Laryng. 137
—— operations, indication for, in fractured maxilla, Odont. 21
Intratracheal anæsthesia in operation for empyema, Anæsth. 7
—— —— in plastic face surgery, Anæsth. 8, 10, 11, 12, 13
Interdental extension in fractures of mandible and maxilla, with laceration of soft parts, Odont. 22
Intubation in stenosis of larynx due to gunshot wounds, Laryng. 191
—— method of anæsthesia in plastic face surgery, Anæsth. 8, 9, 10
—— tubes, Laryng. 191, 199
—— ——, successive insertion in treatment of laryngeal stenosis due to gunshot wounds, Laryng. 186
Iodine ionization of war wounds, Electr. 55
—— —— —— ——, administration of potassium iodide shortly before, Electr. 55
Ionization and ultra-violet light in treatment of scar tissue of amputation stumps, Electr. 54, 55
—— of periodontal membrane in case of rheumatoid arthritis (E. Sturridge), Odont. 112
—— of scar tissue of amputation stumps, Electr. 54
Ireland, sheep scab epidemics in, Epid. 125, 126
——, teeth invaded by mould fungus from, Odont. 96, 97
Iris, implantation cyst of, Ophth. 11
Ischæmic contracture, Volkmann's, R.S.M. Discussion 7
Isonzo districts adjoining war zone, quarantine regulations against cholera enforced among population in, Epid. 48
Italian Medical War Services, special problems of (Cav. Filippo de Filippi), Epid. 40-60
—— troops at Front, sanitary conditions, Epid. 43
—— —— ——, wounds in, deaths from, Epid. 44
Italy, prophylaxis against malaria in, Epid. 52

Jackson, Chevalier, precautionary measures to be taken upon known or suspected impaction of tooth in bronchus, Odont. 106
——, statistics of foreign bodies aspirated into lungs, Odont. 109, 110
Jackson. J. Hughlings, aphasia in relation to testamentary capacity, quoted, Neur. 17
——, cause of rigidity of affected limbs in hemiplegia, Neur. 32
——, classification of cases of aphasia, Neur. 18
——, definition of purpose of speech by, Neur. 6
——, nature of speech function, quoted, Neur. 2
——, on recurring utterances, Neur. 18
Jaundice, camp, in Eastern Campaigns, Epid. 11
—— ——, in Mesopotamia, Epid. 12
——, toxic, ætiology, Epid. 163
—— ——, and minor illnesses, varying incidence of, in T.N.T. factories, Epid. 157
—— ——, cases, with deaths from (1916), Epid. 150
—— ——, curves of incidence, method of working out, Epid. 151
—— ——, delayed occurrence after exposure to T.N.T., Epid. 163
—— ——, development of, 1917, curve compared with that for 1916, Epid. 165
—— ——, incidence of, in T.N.T. factories, curves showing, Epid. 159-162
—— ——, not T.N.T. poisoning notifiable under Factory and Workshop Act, Epid. 165
—— ——, onset determined by cranial injury, Epid. 163
—— ——, prognosis, Epid. 162

Jaw, fractures of, bone-grafting in. Odont. 16, 17
—— ——, comminuted, treatment, Odont. 17
—— —— ——, treatment of posterior edentulous fragment, Odont. 17
—— ——, put up in open or closed bite position, Odont. 25, 26
—— ——, removal of septic teeth in, Odont. 15, 16
—— Injuries Centre of London Command, short account of year's work at (G. Northcroft), Odont. 6
—— —— Department, First London General Hospital, cases received at, 1916-17, Odont. 8, 9
—— —— —— —— —— —— ——, number of staff attached to, Odont. 8
—— —— —— —— —— —— ——, percentage of failure to produce bony union among those discharged, Odont. 9
—— —— —— —— —— —— ——, ratio of cases of fractured mandible to fractured maxilla, Odont. 8
—— —— —— —— —— —— —— —— —— —— —— to those of fractured maxilla and mandible, Odont. 8
—— —— —— —— —— —— ——, statistics as to results of treatment at, Odont. 8
—— —— ——, importance of dental laboratory in, Odont. 7
—— —— ——, skilled radiographers a necessity in, Odont. 3, 7
——, surgery of, intratracheal administration of ether in, Laryng. 35
—— tremor, severe, rapid cure of, Neur. 41
——, upper, excision of, for carcinoma of autrum and palate, followed by diathermy (N. Patterson), Laryng. 34
——, war injuries of (J. H. Badcock), Odont. 1
—— —— ——, bone-grafting in, Odont. 23
—— —— ——, case records must be complete, Odont. 3
—— —— ——, cleansing of teeth in, Odont. 25, 26
—— —— ——, co-operation of dental surgeons with physicians and general surgeons in treatment of cases, Odont. 6
—— —— ——, grafting in, Odont. 4
—— —— ——, immobilization in, Odont. 4
—— —— ——, irrigation in, lotions used for, Odont. 25, 26
—— —— ——, lessons from carefully recorded histories of cases, Odont. 4
—— —— ——, oral hygiene in, Odont. 13, 15
—— —— ——, plastic operations for, care in, Odont. 18
—— —— ——, removal of cheek teeth in, Odont. 15, 16, 18
—— —— ——, share of dental surgeons without medical qualifications in treatment of cases, Odont. 7
—— —— ——, skiagrams of, must be carefully taken, Odont. 3, 7
—— —— ——, splints for, Odont. 3, 7
—— —— ——, treatment in general hospitals, Odont. 3, 6
—— —— —— ——, special hospitals for, Odont. 2, 4
Jaws, closure of, method of treatment at Jaw Injuries centre, Odont. 13
——, dislocation, bilateral, chronic, case of, history and treatment, Odont. 9-11
——, fractures of, treatment at Jaw Injuries centre, Odont. 13, 14
——, functional powers after treatment for war injuries should be noted, Odont. 4
JEREMY, H. R.—Perithelioma of the orbit, Child. 50
JEWELL, W. H.—Discussion on large submaxillary calculus, Laryng. 156
——, endothelioma of the post-nasal space, Laryng. 81
JEWESBURY, REGINALD L.—Case of myotonia, Child. 58
Jhansi, plague epidemic values of β_1 and β_2 (symmetry and asymmetry and form of curves) for, Epid. 92
Joint lesions, tuberculous, healed, restoration of mobility to, Electr. 11
Joints, mobility of, necessary, in case of paralysed muscles, Electr. 33, 34
JONES, ERNEST.—Discussion on repression of war experience, Psych. 18
——, war shock and Freud's theory of the neuroses, Psych. 21

JONES, H. BUCKLAND.—Nasopharyngeal growth for diagnosis, Laryng. 55

JONES, HUGH.—Discussion on case of chronic suppuration of middle ear and cholesteatoma treated by radical mastoid operation, Otol. 78

Jones, Sir Robert, C.B., principles in treatment of fractures, quoted, Odont. 29

JONES-PHILLIPSON, C. E.—Discussion on warfare injuries and neuroses of larynx, Laryng. 188

JORDAN, ALFRED C.—A convenient method of heating the spiral of the Coolidge tube, Electr. 20

——, discussion on abnormal condition of œsophagus, stomach, and colon, Electr. 20

Jugular vein, gunshot wound of, double perforating, Path. 115

Jung, on war neuroses, quoted, Psych. 18

Kangaroo rat, see *Bettongia*

KAZANJIAN, V. H.—Splints combined with sutures through the bone for the immobilization of extensive fractures of the lower jaw, Odont. 67

Keegan-Smith operation in repair of tip of nose, Laryng. 88

—— ——, modified, in repair of loss of lower third of nose, Laryng. 88

KELLY, A. BROWN.—Brain from a patient who presented nystagmoid movements in the pharynx and larynx, Laryng. 141

——, collection of dental cysts and cysts of floor of the nose, Laryng. 58

——, discussion on calculus of tonsil, Laryng. 113

—— —— on case of hyper-adduction of left arytænoid cartilage, Laryng. 12

—— —— —— of papilloma of nose, Laryng. 132

—— —— —— of tumour of naso-pharynx, Laryng. 119

—— —— on cases of stenosis of glottis, Laryng. 77

—— —— —— of tuberculosis of larynx, Laryng. 16

—— —— on dental cyst involving nose, Laryng. 159

—— —— on fusiform dilatation of œsophagus, Laryng. 30

—— —— on lupoid tuberculosis, Laryng. 5

—— —— —— —— of pharynx, Laryng. 45

—— —— on paralysis of arytænoideus, Laryng. 165

—— —— on pharyngeal pouch treated by diverticulopexy, Laryng. 62

—— —— on rhinoplasty, Laryng. 108

—— —— on symmetrical ulceration of vocal cords, Laryng. 118

—— —— on tumour of palate in child aged 8 months, Laryng. 135

—— —— on warfare injuries and neuroses of larynx, Laryng. 194

——, pedunculated carcinoma of pharynx (specimen and slide), Laryng. 123

——, photographs of two children with congenital appendages (teratoid tumours of the nasal septum) Laryng. 125

—— ——, specimen, and slide from case of teratoid growth or hairy polypus of the naso-pharynx, Laryng. 57

——, Presidential address on the relations of laryngology to investigation, teaching, and publication, Laryng. 25

——, simple method of recording diagrammatically movements of the vocal cords, with special reference to tremors (epidiascope demonstration), Laryng. 143-149

——, specimens of naso-antral polypi, with antral attachment, Laryng. 125

Kelly and Cullen, treatment of cases of myoma complicated by cancer of body of uterus, quoted, Obst. 54

Keloid?, case (S. E. Dore), Derm. 55

—— ——, in child, aged 7 (S. E. Dore), Derm. 56

KELSON, W. H.—Discussion on aural bacteræmia, Otol. 52

——, discussion on case of chronic suppuration of middle ear and cholesteatoma treated by radical mastoid operation, Otol. 78

—— —— —— of fibro-papilloma of trachea, Laryng. 53

—— —— —— of orchitis and deafness, Otol. 81

—— —— on cases of tuberculosis of larynx, Laryng. 18

KELSON, W. H.—Discussion on dental cyst involving nose, Laryng. 160
——, discussion on illustrations of nasal endo-rhinoscopy, Laryng. 51
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 41
—— —— on left recurrent laryngeal nerve paralysis, Laryng. 108
—— —— on parotid fistula of twelve months' duration, Otol. 55
—— —— on pharyngeal pouch treated by diverticulopexy, Laryng. 62
——, paralysis of left vocal cord in a man, aged 39, Laryng. 38
—— —— —— —— —— in a woman aged 32, Laryng. 79
——, a tonsil forceps, Laryng. 37, 38
KER, CLAUDE B.—Note on serum sickness in cerebrospinal meningitis (abstract), Med. 1
Keratitis, improvement in, after sewing together of eyelids, Ophth. 8
—— punctata, pigmentation of dots in, Ophth. 3
Keratosis follicularis (Darier's disease), case (W. Knowsley Sibley), Derm. 34
—— —— —— —— ——, microscopical examination of sections from, Derm. 36, 37
—— —— —— ——, history, Derm. 37
Keratosis, punctate, of palms of hands and soles of feet, cases recorded, Derm. 88, 89, 90
—— —— —— —— —— ——, histology, Derm. 89
—— —— —— —— —— ——, relation to nævus, Derm. 90
—— —— —— —— —— ——, two cases occurring in cousins-german (Sir James Galloway and H. G. Adamson), Derm. 85-90
KETTLE, E. H.—Tumours arising from endothelium, Path. 19
Kidney, disease of, in cases of aphasia with mental disorder, percentage in both sexes, Neur. 5
——, diseases of, benefited by Cheltenham waters, Baln. 3
——, gunshot injuries causing fissure from indirect or transmitted violence, Path. 80, 81
—— —— injury of, causing almost complete division, Path. 80
—— (horseshoe) and interstitial nephritis in osteomalacia and infantilism, case (H. C. Cameron), Child. 22
——, pelvis, gunshot wound of, perforating, Path. 107
——, small, hard, associated with tinnitus, Otol. 19
Kidneys, chronic fibrosis, associated with infantilism in children, Child. 25
——, congenital mal-development of, Child. 24
KIRKLAND, R.—Cheltenham, its mineral waters and climate, Baln. 1
Kissingen waters, resemblance of Lansdown waters, Cheltenham, to, Baln. 3
Kittens, retardation of growth in, experimental production by chloroform anæsthetization, Anæsth. 16
Knee-joint, gunshot wound of, minimal, Path. 79
——, tuberculosis of, X-ray treatment beneficial, Electr. 12
Knee-joints, hæmophilia with effusion into, case (Paul Bernard Roth), Child. 29, 41
——, right, radiograms of, in case of hæmophilia with effusion into knee-joints, Child. 30, 31, 41
Knowles and Cole, enumerative study of amœbic infections of intestine, quoted, M.B.L. 2
Kubo, origin of choanal polypus, quoted, Laryng. 126
Kühn's tube, application in anæsthetizing in plastic face surgery, Anæsth. 9, 10, 11
Kut-el-Amara, siege of, effect of reduction of energy value of diet on health of troops, Epid. 75

Labour, character of, during "twilight sleep," Obst. 20, 21, 37, 38
——, difficult, case of, advice of Boerhaave in, Hist. 6
—— pains, effect of scopolamine morphine narcosis on, Obst. 3, 36
——, second stage, effect of scopolamine-morphine narcosis on, Obst. 31
——, third stage, effect of scopolamine-morphine narcosis on, Obst. 10
Labyrinth, ethmoidal, epithelioma of, forceps for removal, Laryng. 33
—— —— ——, lateral rhinotomy, removal (Dan McKenzie), Laryng. 31
—— function of, complete loss of, with complete deafness (W. M. Mollison), Otol. 12

Lachrymal stenosis, double, right side successfully treated by internal dacryocystotomy (West's operation) (J. Donelan), Laryng. 120
Lack, H. Lambert.—Case of epithelioma of larynx removed by "window" resection of the thyroid cartilage, Laryng. 149, 150
——, discussion on cancer of larynx, Laryng. 128
—— —— on dental cysts involving nose, Laryng. 160
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 32
—— —— on nystagmoid movements in pharynx and larynx, Laryng. 143
—— —— on paralysis of arytænoideus, Laryng. 165
——, reasons for nasal obstruction *per se* never being cause of deafness or of ear disease, quoted, Otol. 28, 32
——, thyroid tumour at base of tongue, Laryng. 154
Lahore, plague epidemics, values of β_1 and β_2 (symmetry and asymmetry and form of curves for, Epid. 92, 93
Lake, Richard.—Aural bacteriæmia, with illustrative cases, Otol. 47
——, discussion on operation on mastoid for acute suppurative inflammation, followed by insertion of B.I.P., Otol. 73
——, extradural abscess perforating skull, Otol. 59
——, latent mastoid abscess, Otol. 57
—— loss of hearing due to delay in operating, Otol. 60
Lancashire, G. H.—Discussion on multiple rodent ulcer with X-ray burns, Derm. 45
Lancoborough, Lord, case of, advice of Boerhaave in, Hist. 6
Lanfrank, work of, translated by Halle, Hist. 56
Lang, William.—Discussion on case of Mooren's ulcer, Ophth. 8
——, discussion on hysterical disorders of vision, Ophth. 13, 14
Langdon-Down, J., Mongoloid group of feeble-minded children, quoted, Child. 5
Lansdown water, Cheltenham, composition, Baln. 2, 3
—— —— ——, resemblance to Kissingen water, Baln. 3
Lapicque's condenser method, production of contraction of paralysed muscles by, Electr. 34
Laryngectomy, complete, case (W. Howarth), Laryng. 54
—— (semi-demi) and laryngo-fissure, for intrinsic cancer of larynx (Sir StClair Thomson), Laryng. 126
Laryngitis accompanying symmetrical nodules of vocal cords, Laryng. 118
——, aphonia due to, Laryng. 194
——, exudative or fibrinous, aphonia due to, Laryng. 194, 195
Laryngo-fissure and semi-demi-laryngectomy for intrinsic cancer of larynx (Sir StClair Thomson), Laryng. 126
——, case (A. L. Macleod), Laryng. 114
——, epithelioma of larynx in lady aged 46 ten months after (Sir StClair Thomson), Laryng. 13
——, operation of, Laryng. 152, 153
——, too early performance after gunshot injuries, Larynx. 199
Laryngology and skin diseases, relations between, awaiting investigation, Laryng. 26
——, diploma in, granting of, advocated, Laryng. 28
——, problems awaiting solutions, Laryng. 1
——, relations to investigation, teaching and publication (A. Brown Kelly), Laryng. 25
Laryngoscopy (suspension), removal of multiple papillomata of larynx under, Laryng. 68, 69
—— ——, tracheotomy and removal under, of multiple papillomata of larynx in child (J. Dundas Grant), Laryng. 66
Laryngotomy and tracheotomy tube, new (A. L. Abel), Laryng. 110
—— or laryngo-tracheotomy in gunshot wounds of larynx, Laryng. 181
Laryngo-tracheostomy, Laryng. 191
Larynx and neck, shrapnel wound of, case (W. Stuart Low), Laryng. 179
—— and nose, lupoid tuberculosis (Irwin Moore), Laryng. 22
—— and pharynx, nystagmoid movements in, brain from patient presenting (A. Brown Kelly), Laryng. 141

Larynx, cancer of, extrinsic, four years after operation through side of neck (Sir StClair Thomson), Laryng. 127
—— —— ——, treatment by diathermy, Laryng. 128
—— ——, intrinsic, laryngo-fissure and semi-demi-laryngectomy one year after operation (Sir StClair Thomson), Laryng. 126
——, changes in, following gassing, Laryng. 188, 195
——, congestion and œdema following gunshot injuries, Laryng. 199
—— —— —— —— —— ——, treatment by dry-cupping, Laryng. 193
——, epithelioma of, in lady aged 46, ten months after laryngo-fissure (Sir StClair Thomson), Laryng. 13
—— ——, question of tracheotomy in, Laryng. 152, 153
—— ——, removed by "window" resection of thyroid cartilage (H. Lambert Lack), Laryng. 149
——, examination, results in case of lupoid tuberculosis of pharynx, Laryng. 40
——, fibro-papillomata of, simulating laryngeal tuberculosis, removal of (J. Dundas Grant), Laryng. 64
——, framework of, gunshot injuries to, Laryng. 180, 181
——, gunshot injuries of, recovery of voice after, Laryng. 181
—— —— ——, treatment by rest of voice, Laryng. 190. See also under *Larynx*, gunshot wounds, treatment
—— —— wounds of, after-results, Laryng. 181
—— —— ——, cases (J. Gay French), Laryng. 176
—— —— —— —— (W. Douglas Harmer), Laryng. 176
—— —— —— —— (E. A. Peters). Laryng. 177
—— —— —— —— (H. Tod), Laryng. 176
—— —— ——, complications, Laryng. 181
—— —— ——, followed by congestion and œdema, treatment by dry-cupping, Laryng. 193
—— —— ——, mortality, Laryng. 181
—— —— ——, scar tissue in, treatment by radium, Laryng. 189
—— —— ——, statistics, Laryng. 180
—— —— ——, symptoms following, Laryng. 180
—— —— ——, treatment, Laryng. 181
—— —— —— —— by tracheotomy, Laryng. 181, 187, 188, 190, 191, 193
——, lipoma of, removal (Hunter Tod), Laryng. 67
——, malignant disease of, in female (Irwin Moore), Laryng. 83
——, papilloma of (A. Wylie), Laryng. 139
——, papillomata of, multiple, in child, tracheotomy and removal under suspension laryngoscopy (J. Dundas Grant), Laryng. 66
—— —— ——, removed by operation (suspension method) after tracheotomy, death five weeks later from acute membranous tracheitis and bronchitis (H. Tod), Laryng. 68
——, perichondritis of (G. W. Dawson), Laryng. 133
—— ——, causes of death in, Laryng. 133
——, scars of, following gunshot wounds, contraction, Laryng. 190, 191
——, stenosis, following gunshot injuries, treatment by tracheotomy, Laryng. 190, 191. 199
—— ——, post-traumatic, treated by homologous cartilage graft, case (G. S. Hett), Laryng. 97
—— ——, following gunshot wounds, treatment, method, Laryng. 186
—— ——, inflammatory, following gunshot wounds, Laryng. 181, 190, 191
—— —— —— —— —— ——, treatment, Laryng. 190, 191
——, tuberculosis of, see *Tuberculosis*, laryngeal
——, tuberculous infiltration, Laryng. 6
——, warfare injuries and neuroses of, discussion on, Laryng. 180-200 (W. Douglas Harmer, 180, 199; T. Mark Hovell, 192, 194; A. Brown Kelly, 194; C. MacMahon, 197; J. F. O'Malley, 186; W. Permewan, 185; E. A. Peters, 186; C. E. Jones-Phillipson, 188; A. E. Hayward Pinch, 189; H. Smurthwaite, 182, 200; R. H. Scanes Spicer, 197; W. Stuart-Low, 193; Sir StClair Thomson, 190; H. Tilley, 187; G. H. L. Whale, 193)

Larynx, warfare injuries of, epidiascope demonstration of specimens from cases of (W. Douglas Harmer), Laryng. 173
Lateral sinus, abnormally forward position of, Otol. 10, 11
—— ——, accidental exposure, danger of, Otol. 50
—— ——, cholesteatoma exposing, case (S. Hastings), Otol. 10
—— ——, exposure of, followed by thrombosis of sinus, Otol. 52
—— —— ——, when harmless, Otol. 52
—— ——, groove, opening of, Otol. 53
—— —— infections, treatment, Otol. 52
—— ——, opening of, in cases of doubtful infection, Otol. 50
—— ——, syringing, Otol. 11
—— —— thrombosis and aural bacteræmia, diagnosis between, Otol. 49, 50
—— —— —— due to acute mastoid suppuration, diagnosis from aural bacteræmia, Otol. 51
—— —— —— following accidental exposure of sinus, Otol. 50, 52
Latham, P. M., effects of reduction of diet at Millbank Penitentiary, quoted, Epid. 78, 79
LAZARUS-BARLOW, W. S.—An attempt at the experimental production of carcinoma by means of radium, Path. 1
Leaves, electro-motive force in, Electr. 26, 27
——, galvanometer experiments with, Electr. 27
Leechcraft, primitive, Hist. 47, 48
LEERSUM, E. C. VAN.—Two of Boerhaave's lecture lists, Hist. 11
Lefèvre, analysis of doctrines of specific energy of foodstuffs, Epid. 62
——, calorie value of diet, quoted, Epid. 56
——, effects of cold and wind on food requirements of sedentary worker, Epid. 71
LEFTWICH, R. W.—Shakespeare's medical son-in-law, John Hall (abstract), Hist. 77
Leg, double amputation for endothelioma, Path. 20, 21
——, gaping wound of, received during cleaning of rifle, Path. 50
Legs and thigh, twisting and flattening of, in osteomalacia sclerotica (boomerang bones), Path. 40, 41
LEGGE, T. M.—Delayed occurrence of toxic jaundice after exposure to T.N.T., quoted, Epid. 163
——, discussion on epidemiology of tri-nitro-toluene poisoning, Epid. 165
Leipzig district, death-rates of occupations of women in (1887-1901), Epid. 142
Leishmania in Indian troops in Mesopotamia, Epid. 25
—— —— in Eastern campaigns, Epid. 24
——, suspected carrier of, Epid. 25
Lepra, case of, advice of Boerhaave in, Hist. 4
Leptothrix in caseous masses of lacunar tonsillitis, Laryng. 113
Letheon, name given by W. T. G. Morton to his anæsthetic, Hist. 66, 67
Leukæmia, cutaneous hæmorrhages in T.N.T. workers, wrongly ascribed to T.N.T. poisoning, Epid. 157
LEVY, A. G.—Discussion on administration of anæsthetics in home military hospitals, Anæsth. 12
——, discussion on physiology of anæsthesia by chloroform, Anæsth. 27
LEY, GORDON.—Discussion on scopolamine-morphine narcosis in childbirth (reply), Obst. 44
Leyden, University of, attractions to foreigners, Hist. 14
—— ——, students from Great Britain, Hist. 14
—— ——, University of Edinburgh offshoot of, Hist. 15
Lice, destruction by disinsector, Epid. 38
—— ——, in prophylaxis against relapsing fever, Epid. 21, 22
——, in Serbian Army, destruction of, Epid. 33-35
—— —— —— —— by steam disinfection appliances, Epid. 35
——, spread of typhus fever in Serbia by, disinfection measures against, Epid. 33-37, 38
Lichen obtusus corneus, case (W. Knowsley Sibley), Derm. 97
—— planus, acute generalized, treated by lumbar puncture (G. Pernet), Derm. 81

Lichen planus, linear, case (E. G. Graham Little), Derm. 64
Ligatures, absorbable, employed in treatment of painful amputation stumps, R.S.M. Lect. 23
——, products of irritation from, carried to nerve lymphatics, R.S.M. Lect. 10
——, unabsorbable, causing irritation in amputation stumps, R.S.M. Lect. 16, 17
Light metal workers, weavers and quarriers, average energy intakes compared, Epid. 67
Light sense in night blindness, luminous type for estimating (F. Moxon), Ophth. 11
Lipoma of larynx removed by operation (Hunter Tod), Laryng. 67
Liquids, regurgitation of, and dyspnœa during drinking, in tuberculosis of larynx, relieved by intralaryngeal operation, case (J. Dundas Grant), Laryng. 63
Liquor ammoniæ in lateral sinus infections, Otol. 52
Lister, W. T., explosive effects of gunshot wounds in globe, quoted, Path. 118
Little, E. G. Graham.—Case for diagnosis, Derm. 58
——, case of acne keloid, Derm. 51
—— —— —— scrofulosorum, Derm. 21
—— —— of adenoma sebaceum, Pringle type, Derm. 25
—— —— of circinate erythema, possibly the "erythème aunulaire centrifuge" of Darier, Derm. 1
—— —— of erythema ab igne, or possibly "melanopathia syphilitica" of Wilson, Derm. 53
—— —— of extensive dermatitis, possibly mycosis fungoides, Derm. 46
—— —— of fibrosarcomata, grouped in a peculiar manner on the chest, Derm. 41
—— —— of granuloma annulare, Derm. 92
—— —— of impetigo of Bockhart of unusual extent and severity, Derm. 40
—— —— of linear lichen planus, Derm. 64
—— —— of lupus erythematosus following upon ringworm of the scalp in an adult treated with X-rays, Derm. 4
—— —— of rodent ulcer treated by radium, Derm. 63
—— —— of sporotrichosis, Derm. 102
—— —— of trophic ulceration of the foot after gunshot wound, Derm. 47
—— —— of ulcus molle serpiginosum, Derm. 21
—— discussion on case of bromide eruption, Derm. 34
—— —— —— of granuloma annulare, Derm. 31
—— —— —— of guttate morphœa, Derm. 95, 96
—— —— —— of Hodgkin's disease with prurigo, Derm. 91
—— —— —— of ichthyosis hystrix linearis of palms, Derm. 99
—— —— —— of miliary syphilide, Derm. 100
—— —— —— of persistent erythema, Derm. 60
—— —— —— of pityriasis rosea, Derm. 40
—— —— —— of pre-mycotic erythrodermia, Derm. 98
—— —— on cases for diagnosis, Derm. 65, 66
—— —— on erythema multiforme perstans, Derm. 114
—— —— on syphilitic rash appearing after twenty-three injections of novarsenobillon, Derm 80
—— —— on two cases of alopecia areata, Derm. 62
——, further report on case of extensive dermatitis, Derm. 77
——, multiple rodent ulcers with X-ray burns, Derm. 43
——, syphilide with resemblances to pityriasis rosea, Derm. 57
Liver, acute or subacute yellow atrophy of, essential cause in munition workers, Epid. 166, 167
—— —— yellow atrophy of, deaths from (1911-17), Epid. 150
—— —— —— ——, in syphilis, Epid. 163, 166
—— —— —— ——, in T.N.T. poisoning, Epid. 163
——, affections of, benefited by Pittville water, Cheltenham, Baln. 5
—— and lung, gunshot injuries of both, produced by same projectile, contrast between, Path. 85, 86
—— and spleen, enlarged, case of, specimens (J. Porter Parkinson), Child. 33
—— ——, enlargement, mercury and potassium iodide in, Child. 13, 14

Liver, bullet wounds of, increased damage due to fracture of overlying ribs, Path. 62
——, cirrhosis of, case of, advice of Boerhaave in, Hist. 2
——, diseases of, benefited by Cheltenham waters, Baln. 3, 5
——, effects of T.N.T. poisoning on, Epid. 150, 151, 158, 159, 162-165
——, grazing of, by bullet, Path. 59
——, gunshot injuries of, causing complete division of organ, Path. 59
—— —— —— —— detachment of portions of organ, Path. 59
—— —— —— —— fissured perforations, stellate and linear, Path. 52-59
—— —— injury of, disruptive, Path. 69
—— —— wounds, minimal, Path. 69-72
—— —— ——, perforating, Path. 89
——, gutter wounds of, due to bullet, Path. 60
——, left lobe of, pistol bullet wound of, fissured, Path. 51
——, tunnelled wound of, caused by shrapnel bullet, Path. 66
—— —— ——, with perforation of vena cava, caused by shell fragment, Path. 68
—— —— wounds of, caused by shell fragments, Path. 63-65, 66, 67
Liverpool, measles epidemic in, periodicities, Epid. 100
London and Shetland Isles, age-incidence of deaths from pulmonary tuberculosis in males, compared, Epid. 147
——, plague epidemic (1665), progress of, not altered by emigration, Epid. 90
—— —— epidemics (1637-46), course of, Epid. 101, 103
—— —— ——, records, how far reliable, Epid. 90
—— —— ——, values of β_1 and β_2 (symmetry and asymmetry and form of curves) for, Epid. 92
—— scheme for education in radiology and electro-therapeutics, Electr. 5
——, small-pox epidemic (1902), number of persons infected, Epid. 116
Lotio sodæ chlorinatæ, application in fractures of mandible, Odont. 27
Lotions used for irrigation in jaw injuries, Odont. 25, 26
Louse-borne diseases, occurrence of, in Eastern campaigns, Epid. 10
LUCAS, W. PALMER.—Coagulation of the blood in purpura and hæmophilia, Derm. 42
Lumbar puncture in intrathecal injection of antitoxin serum, needles for, R.S.M. Discussion 24
—— —— in treatment of acute generalized lichen planus, case (George Pernet), Derm. 81
Lung, abscess of, development, in case of tooth impacted in secondary bronchus, Odont. 103
—— and liver, gunshot injuries of both, produced by same projectile, contrast between, Path. 85, 86
——, collapse of, of one year's duration, produced by foreign body (collar stud) in left bronchus, case (J. Dundas Grant), Laryng. 71
——, contusion, without wounding, by shell fragment, Path. 81, 82
——, fragments of rib or clavicle driven into, with missile, Path. 88
——, gunshot injuries of, with absence of disruptive effect, Path. 83, 84, 85
—— —— ——, with disruptive phenomena, Path. 87
——, primary sarcoma of, with specimen (J. Porter Parkinson), Child. 19
——, right, gunshot wound of, minimal, causing septic hæmothorax, ending fatally, Path. 73
——, shell fragments embedded in, Path. 88
——, superficial injury from simple displacement of fragments of broken rib in gunshot injury, Path. 88
——, ventilation of, during chloroform and ether narcosis, Anæsth. 25
—— —— —— —— —— ——, plethysmograph used for, Anæsth. 25
Lungs, examination, results in case of lupoid tuberculosis of pharynx, Laryng. 40, 41
——, foreign bodies impacted in, cause death if not removed, Odont. 110
—— —— —— ——, removal, forceps for, Odont. 110, 111
——, transport of chloroform from, chief vehicle for, Anæsth. 22
Lupus, anterior nasal stenosis due to, impairment of hearing rare in, Otol. 28

Lupus erythematosus following ringworm of scalp in adult treated with X-rays, case (E. G. Graham Little), Derm. 4
—— —— of unusual distribution and character (A. Eddowes), Derm. 75
—— mutilans, case (J. L. Bunch), Derm. 61
——, treatment by diathermy, Electr. 44
—— vulgaris, with cutaneous horns, case (W. K. Sibley), Derm. 54
Lymphangioma tuberosum multiplex, case (G. Pernet), Derm. 30
Lymphogranulomatosis pruriginosa, see *Pruritus* in Hodgkin's disease
LYNHAM, J. E. A.—Discussion on X-rays in treatment of nævus, Electr. 14
LYSTER, C. R. C.—Discussion on surgical diathermy, Electr. 45

McCurdy, mental conflicts in soldiers, quoted, Psych. 30
——, sense of shame in soldiers from increasing sense of fear, Psych. 31
McDonald, Stuart, acute yellow atrophy of liver in syphilis, Epid. 163
Macedonia, malaria epidemic in (1916), Epid. 15, 16
—— —— —— ——, failure of quinine prophylaxis, Epid. 18
McGrigor, Sir James, reduction in diet at Millbank Penitentiary sanctioned by, Epid. 77, 79, 80
Machine-gun bullet wounds of stomach, disruptive phenomena, Path. 93, 94
MCILRAITH, C. H.—Discussion on surgical diathermy, Electr. 45
MCKENZIE, DAN.—Case of orchitis and deafness, Otol. 79
——, discussion on aural bacteræmia, Otol. 49, 52
—— —— on cancer of larynx, Laryng. 127
—— —— on case of frontal sinus suppuration, Laryng. 112
—— —— on dental cysts involving nose, Laryng. 160
—— —— on fusiform dilatation of œsophagus, Laryng. 30
—— —— on latent mastoid abscess, Otol. 58
—— —— on operation on mastoid for acute suppurative inflammation followed by insertion of "B.I.P.," Otol. 70
—— —— on recurrent herpes of auricle, Otol. 54
—— —— on repair of nose by paraffin injection, Laryng. 135
—— —— on surgical diathermy, Electr. 46
——, epithelioma of the ethmoidal labyrinth; lateral rhinotomy; removal, Laryng. 31
——, intranasal frontal sinus operation under nitrous oxide anæsthesia, Laryng. 137
——, a large submaxillary calculus, Laryng. 156
——, submaxillary gland suppuration, Laryng. 155
——, tonsil artery forceps, Laryng. 137
MACLEOD, A. L.—Case of fibrosarcoma (?), Laryng. 56
——, case of laryngo-fissure, Laryng. 114
MACLEOD, J. M. H.—Case of granuloma annulare, Derm. 31
—— —— of grouped comedones in an infant, Derm. 111
—— —— of Hodgkin's disease with prurigo, Derm. 91
——, discussion on case of keratosis follicularis (Darier's disease), Derm. 38
—— —— —— of tertiary syphilis of scalp and face, Derm. 106
MACMAHON, CORTLANDT.—Discussion on warfare injuries and neuroses of larynx, Laryng. 197
MACNALTY, A. S.—Discussion on epidemiology of tri-nitro-toluene poisoning, Epid. 166
Macro, Cox, biographical details and family records relating to, Hist. 21, 22
——, letters of Boerhaave to (D'Arcy Power), Hist. 21
Macropus, enamel of, forming, incorporation of Tomes's processes into, Odont. 57
—— —— ——, preparation, showing large spherites and small forming blocks of enamel prisms, Odont. 62
—— —— showing calcification between columns of prisms, Odont. 56
—— ——, transverse section, Odont. 54
Magnus-Levy, metabolism of fasting individual, quoted, Epid. 64, 65

Magnus-Levy and Blix, muscular work of average mountain climber, quoted, Epid. 57
Malaria, epidemic in Macedonia (1916), Epid. 15, 16
—— —— —— ——, mosquitoes transmitting, Epid. 16
—— —— in Mesopotamia (1916-17), Epid. 16, 17
—— in Eastern campaigns, Epid. 15
—— in Italian army, prophylaxis against, Epid. 52
—— —— ——, prophylaxis against by quinine administration, Epid. 52
—— in Italy, prophylaxis against, Epid. 52
—— in soldiers, effect on heart muscle, Anæsth. 2
——, morphia contra-indicated in cases of. Anæsth. 6
——, prophylactic measures against in Suez Canal region, Epid. 17
——, quinine prophylaxis against, Epid. 18
Malcolm, J. D.—Discussion on undiagnosed cancer of body of uterus complicating myoma treated by total hysterectomy, Obst. 57
Males, age incidence of deaths from pulmonary tuberculosis among, in Shetland Islands and London compared, Epid. 147
Malignant degeneration of skin, senile, treatment, Derm. 45
—— disease of larynx in female (Irwin Moore), Laryng. 83
—— —— of nose, prognosis, Laryng. 33
—— ——, salivary calculus mistaken for, Laryng. 82
—— growth removed from right antrum (H. Tilley), Laryng. 136
—— growths, fungating, removal by diathermy, use of two active electrodes in, Electr. 39
—— —— ——, treatment by diathermy, Electr. 39, 45, 48
—— —— in ethmoid, amenability to surgery, Laryng. 32
—— —— in nose, amenability to surgery, Laryng. 32
—— ——, treatment by diathermy, difficulties in, Electr. 39
—— —— —— ——, duration of life after, Electr. 42
—— —— —— ——, results, Electr. 41
Malingering, hysterical disorders of vision distinct from, Ophth. 14, 15
——, neurotic symptoms mistaken for, Psych. 29, 30
Man and black and brown rat, values of β_1 and β_2 and date of mean of epidemic for, in plague epidemic, Bombay (1908-11), Epid. 97
—— —— —— —— —— —— —— for district epidemics of plague in Bombay, Epid. 95, 96, 97, 112
—— and rat, plague in, relation between, Epid. 110
——, number of deaths from plague in, and number of deaths in black and brown rats in fortnight preceding, Bombay (1907-11), correlations between, Epid. 111
Manchuria, pneumonic plague epidemic in (1911), Epid. 131
Mandible and maxilla, fractures of, treatment, Odont. 22
——, comminution, extensive, displacement downward of anterior fragments and upwards of posterior fragments, Odont. 68
——, fractured, Bruhn-Lindemann needle extension for fixing edentulous portions of (W. H. Dolamore). Odont. 66
——, fractures of, alveolar tilting in, Odont. 39
—— ——, bone-fragments in, preservation, Odont. 29
—— ——, comminuted, extensive, reaching from angle to angle, with no existing lower teeth, cases of, treatment, Odont. 75, 76
—— —— —— —— —— —— —— —— —— —— —— —— —— —— by use of extra-oral appliances, Odont. 80-83
—— —— —— ——, with existing teeth posterior to fracture on both sides, cases of, treatment, Odont. 69-72
—— —— —— ——, with serviceable teeth on one side only, posterior to the fractures, cases of, treatment, methods adopted, Odont. 73, 74
—— ——, control of posterior fragment in, Odont. 32, 33, 34-36, 47
—— ——, diagnosis, by intra-buccal film method, Odont. 28

Mandible, fractures of, diagnosis by X-ray, Odont. 27, 28
—— ——, extensive immobilization by splints combined with sutures through bone (V. H. Kazanjian), Odont. 67-86
—— —— —— —— —— —— —— —— ——, technique of operation, Odont. 84-86
—— ——, immobilization in, Odont. 19
—— ——, loss of bone in, Odont. 28
—— ——, preservation of teeth after, Odont. 28
—— ——, prevention of sepsis, Odont. 28, 29
—— ——, ratio of cases to those of fracture of maxilla and to those of fracture of maxilla and mandible at Jaw Injuries Department, First London General Hospital, Odont. 8
—— ——, reduction, Odont. 19
—— ——, skiagrams of, interpretation, Odont. 27
—— ——, splints in, Odont. 19, 25, 26
—— —— ——, application, Odont. 29-31
—— —— ——, fixation, Odont. 31, 32
—— —— —— —— in open-bite position, Odont. 32, 33
—— —— —— —— with circumferential wires, Odont. 32
—— ——, treatment, alignment in, Odont. 29, 30
—— —— ——, initial, antiseptic, Odont. 27
—— —— ——, principles (C. H. Bubb), Odont. 27-37
—— ——, ununited, non-union, percentage, Odont. 31
—— —— ——, treatment, operative (Percival P. Cole), Odont. 38
—— —— —— ——, percentage of successful cases, Odont. 46
—— —— ——, with considerable loss of tissue, treatment, Odont. 49
—— —— —— —— —— —— —— by pedicled bone-graft or bone transplant, Odont. 40-43
—— —— ——, with small loss of tissue, treatment by plating, Odont. 39, 40
—— —— —— —— —— —— —— by wiring, Odont. 38, 39
——, muscles attached to, Odont. 68
——, neck of, ankylosed to zygoma, Odont. 88
Manipulations, forcible, in treatment of hysterical contractures, Neur. 41
Mannite, solution, preventing decomposition of scopolamine, Obst. 2
Marett, R. R.—Primitive medicine man (abstract). Hist. 47
Marienbad waters, resemblance of Pittville water, Cheltenham, to, Baln. 3
Marines and seamen, weekly rations of (1823), Epid. 81
Marinesco, G.—Characteristics of amputation neuromata, R.S.M. Lect. 5
Marsupials, ameloblast cells of, changes in, Odont. 65
——, enamel of, tubular (J. Howard Mummery), Odont. 49
Massa, Nicolaus, treatment of syphilis by fumigation, quoted, Hist. 58
Massage in treatment of functional nervous disorders in soldiers, Neur. 48
—— —— —— of muscles with injured nerve-supply, Electr. 31, 32
Mastoid abscess, latent (R. Lake), Otol. 57
—— —— ——, five years after attack of measles, Otol. 57
—— —— ——, pus evacuating into naso-pharynx, Otol. 58, 59
—— —— —— —— —— —— ——, cases recorded, Otol. 59
——, disease of, acute, local non-suppurative infection following, Otol. 51
—— operation, exploration of nasal accessory sinuses before, Otol. 35
—— —— followed by depressed scar, Otol. 56
—— —— —— —— ——, treatment suggested, Otol. 56
—— —— for acute suppurative inflammation, followed by injection of spirit drops, Otol. 74, 75
—— ——, for chronic suppurative inflammation, followed by injection of ether, Otol. 75
—— —— —— —— —— —— by insertion of bismuth iodoform and liquid paraffin, and suture of external wound in its entire length at close of operation (H. Tilley), Otol. 69-76
—— ——, radical, cholesteatoma performing, cure resulting, Otol. 10, 11

Mastoid operation, radical, in treatment of chronic suppuration of middle ear and cholesteatoma; retention of cholesteatoma matrix, case (J. Dundas Grant), Otol. 77
—— ——, skin incision in, Otol. 70, 71
—— operations, choice of dressings after, Otol. 2, 3
—— ——, treatment after, Otol. 2, 3
—— region and auricle, cancer of, treatment by diathermy, Electr. 46
——, suppuration, acute sinus thrombosis due to, diagnosis from aural bacteræmia, Otol. 51
Mastoiditis, acute, furuncle of meatus mistaken for, Otol. 55
—— ——, spontaneous recovery (H. J. Banks Davis), Otol. 54
——, subacute, paralysis of corresponding sixth nerve, recovering, latent maxillary antral infection (case illustrating advantageous exploration of sinuses by suction syringe) (P. Watson-Williams), Otol. 62
Mathematical theory of epidemics, Epid. 115-127
Maxilla and mandible, fractures of, ratio of cases of fracture of mandible to, at Jaw Injuries Department, First London General Hospital, Odont. 8
—— —— ——, treatment, Odont. 22
——, fractures of, complicated by irreducible malformations of palate, Odont. 20, 21
—— ——, involvement of antrum in, Odont. 21
—— ——, ratio of cases of fracture of mandible to, at Jaw Injuries Department, First London General Hospital, Odont. 8
—— ——, treatment, Odont. 21
—— —— with loss of supporting structure, treatment by implantations of cartilage Laryng. 88
——, unavailable as support to lower splints in cases of extensive comminuted fractures of mandible, use of extra-oral appliances, Odont. 80-83
——, wrenched from bony base, bandage and splint used in case of, Odont. 21, 22
Maxillary gland, tumour of, case of, advice of Boerhaave in, Hist. 8
Mayou, M. S.—Discussion on luminous type for estimating light sense in night blindness, Ophth. 12
Measles, epidemic in Liverpool, periodicities, Epid. 100
——, epidemics in young soldiers, prophylaxis against, Epid. 54, 55
—— followed five years later by mastoid abscess, Otol. 57
——, history of, in cases of morphœa guttata, Derm. 27
Meat, calorie values in dietary at Millbank Penitentiary, Epid. 78, 79, 80
——, fresh, as anti-scorbutic, Epid. 54
——, protein value of, Epid. 57
—— ration, reduction in Italian Navy and Army, Epid. 42, 43
Meatus, aural, cartilaginous, right cystic swelling occluding (H. J. Banks Davis), Otol. 6
—— ——, concentric narrowing of, following scarlet fever at age of 5 (H. Tilley), Otol. 65
—— ——, furuncle of, mistaken for acute mastoiditis, Otol. 55
Mediastinal growth causing complete paresis of left vocal cord (Irwin Moore), Laryng. 49
Medical attendance, skilled, during "twilight sleep," must be constant, Obst. 34, 42
—— education, European, influence of Boerhaave on, Hist. 15
—— officers, factory whole-time; introduction into T.N.T. factories, Epid. 153
—— school attached to Italian army in war zone, Epid. 53
Medicine man, primitive (R. R. Marett), Hist. 47
—— —— ——, alliance with priests, Hist. 47, 48
—— —— ——, professional activity of, Hist. 47, 48
——, modern, primitive sources of, Hist. 47
Medico-legal aspect of impaction of tooth in bronchus, Odont. 107
Meek, correlation between body mass and energy, quoted, Epid. 68
Melæna neonatorum, treatment by application of coagulose, Child. 8, 9
—— —— —— by injection of whole blood or blood serum (R. Hutchison), Child. 7
"Melanopathia syphilitica" of Wilson or erythema ab igne, case (E. G. Graham Little), Derm. 53

Memory, "islands of," in "twilight sleep," Obst. 4, 3, 10
—— test as guide to dosage of scopolamine-morphine in "twilight sleep," Obst. 7, 8, 17, 30, 34, 42
Ménière's disease and Ménière's symptoms, distinction between, Otol. 15
—— ——, classical case of Ménière, history, Otol. 23
—— —— —— —— ——, nature of, Otol. 22
—— ——, obstruction of Eustachian tube in, mechanical and sensory elements in, Otol. 22, 23
—— symptoms, closure of Eustachian tubes accompanying, Otol. 16
—— ——, due to middle-ear disease, Otol. 15
—— ——, prevalence increasing, Otol. 20
—— ——, treatment, Otol. 19, 20
Meningitis, cerebro-spinal, occasional prevalence in Eastern campaigns, Epid. 29
—— —— serum sickness in (Claude B. Ker), Med. 1
——, suppurative, and serous, distinction between, Laryng. 112
—— ——, for fourteen days in frontal sinus suppuration; operation; recovery (W. M. Mollison), Laryng. 111
Mennell, James.—Discussion on treatment of injury to peripheral nerves, Electr. 32
Mental and moral force, reserve of, value, Psych. 26, 27
—— capacity, aphasia and agraphia co-existing with, Neur. 19
—— condition of patients, too little stress laid upon, in medical education, Neur. 43
—— conflict in soldiers, Psych. 30
—— confusion during "twilight sleep," Obst. 20, 30, 36
—— content, inaccessibility to manifest consciousness, Psych. 1
—— ——, painful elements coming to surface at night, Psych. 13
—— —— —— ——, repression, by day, Psych. 13
—— decay, aphasia first symptom of, Neur. 19
—— ——, aphasia supervening on, Neur. 19
—— disease, aphasia in relation to (R. Percy Smith), Neur. 1
—— ——, signs of, predominating, accompanying speech troubles, Neur. 4
—— disorder, aphasia accompanied by, see *Aphasia*
—— ——, disturbance of speech function must be combined with, Neur. 19, 20
—— ——, effect of aphasia upon, Neur. 6
—— ——, slight, co-existing with great affection of external speech, Neur. 19
—— failure, concurrent with, or subsequent to, attack of aphasia, Neur. 6
—— —— —— —— —— —— ——, cases reported, Neur. 10-14
Mentally defective child with Negroid-Mongoloid facies, congenital heart disease in (F Parkes Weber), Child. 3
Mercury and iodide of potassium in enlargement of liver and spleen, Child. 13, 14
——, perchloride, diluted, injection in streptococcal poisoning, Otol. 52
—— —— solution, application in accladiosis, Derm. 18
Mesopotamia, beri-beri among British troops in, Epid. 26
——, camp jaundice in, Epid. 12
——, dysentery in, Epid. 3
——, enterica in (1916), Epid. 10
——, leishmania among Indian troops in, Epid. 25
——, malaria epidemic in (1916-17), Epid. 16, 17
——, scurvy among Indian troops on Tigris front in, Epid. 27
—— Force, cholera epidemic among (1916), Epid. 13, 14
Metabolism, effect of heliotherapy on, Electr. 11
——, German school of, rationing systems of European armies based on, Epid. 40
——, imperfect or perverted disorders due to, benefited by Cheltenham waters, Baln. 3
—— of fasting individuals, Epid. 64
—— of protein in body, Epid. 57
Metal-grinders on sandstone wheels, mortality from tuberculosis among, difficult to obtain, Epid. 138

Metastases, innocent tumour forming, Path. 29

Mezzadri, Friar Bernardin, on St. Cosmas and St. Damian, quoted, Hist. 75, 76

Mice, inoculation with radium to induce production of carcinoma, results, Path. 2

Microfilaria nocturna in blood and urine, enumeration method, M.B.L. 5

Military duties, repression of thoughts of, ill-effects, Psych. 11, 12

—— hospitals (home), administration of anæsthetics in (J. F. W. Silk), Anæsth. 1

—— —— ——, anæsthetists in, equipment, Anæsth. 3

—— —— —— ——, personality, Anæsth. 3

—— —— ——, avoidance of pure undiluted chloroform in, Anæsth. 4

—— —— ——, class of injury specially met with in, Anæsth. 2

—— —— ——, ether-bronchitis in, Anæsth. 9

—— patients, diseases of, difficulties in alteration of diagnosis, Neur. 43

—— service, artificial production of folliculitis in Russian Jews to avoid, Derm. 83, 84

—— ——, return to, treatment of war-neurosis in soldiers to promote, Psych. 16

Milk, protein value of, Epid. 57

Millauro, O.—New foot-key for gas-cylinders, Anæsth. 28

Millbank Penitentiary, diet at, Epid. 76

—— —— ——, calorie values, Epid. 78

—— —— ——, reduction of, Epid. 77

—— —— —— ——, results, Epid. 77, 79

—— ——, epidemic at, Epid. 77

—— ——, female prisoners, daily dietary, Epid. 80

—— ——, male prisoners, daily dietary, Epid. 79

—— —— —— ——, occupations, Epid. 78

Miller, W. D., boring of dentine by *Saccharomyces mycoderma*, quoted, Odont. 99

Milligan, Sir **William**.—Discussion on epithelioma of ethmoidal labyrinth, Laryng. 33

——, fibro-papilloma of trachea, removal by external operation, recovery, Laryng. 52

——, fracture of four rings of the trachea, urgent dyspnœa, operation, recovery, Laryng. 54

——, piece of mutton-bone removed from the entrance to the œsophagus, Laryng. 52

Mind, method for dealing with anti-ego impulses of, Psych, 26

——, unconscious, interpretation of death by, Psych. 36

Mineral water springs, care of, Baln. 7

—— waters, examination by recent methods, Baln. 8

—— —— of Cheltenham (R. Kirkland), Baln. 2-6

—— ——, surface treatments, choice of, Baln. 8

—— —— —— —— in case of disabled soldiers, Baln. 8

Mitchell, S. Weir, nature of erythromelalgia, quoted, Child. 26

Mitral stenosis, clinical features, changes in, after onset of fibrillation of auricle (A. J. Whiting), Therap. 1-52

—— —— —— —— —— —— —— —— ——, case exhibiting, Therap. 1-52

—— —— —— —— —— —— —— —— —— —— ——, table showing, Therap. 9

—— ——, effects of digitalis in, after onset of fibrillation of auricle as compared with effect of in pre-fibrillation stage, Therap. 10

—— ——, with fibrillation of auricle, case of, termination of history, Therap. 38, 39

Moisture, effect on galvanometer deflexions, Electr. 25, 27, 28

Mola, Brigadier-General.—Discussion on Italian Medical War Services, Epid. 58

Mole, pigmented, in centre of vitiligo patches (J. L. Bunch), Child. 17

Moles, pigmented, "halos" round, Child. 18

Mollison, W. M.—Case of cerebral abscess, hernia cerebri, avulsion of abscess wall, complete homolateral ophthalmoplegia, recovery, Otol. 61

——, case of complete deafness and complete loss of labyrinth function, ? cause, Otol. 12

—— —— of frontal sinus suppuration, suppurative meningitis for fourteen days, operation, recovery, Laryng. 111

——, discussion on aural bacteræmia, Otol. 50

Mollison, W. M.—Discussion on case of cholesteatoma exposing lateral sinus, Otol. 10
——, discussion on case of orchitis and deafness, Otol. 80
—— —— on lupoid tuberculosis, Laryng. 6
—— —— on operation on mastoid for acute suppurative inflammation followed by insertion of B.I.P., Otol. 75
—— —— on surgical *contretemps* (accident in intratracheal administration of ether), Laryng. 74
Mollities ossium, diagnosis from osteomalacia sclerotica, Path. 42, 43
Molluscum contagiosum, agminated (J. L. Bunch), Child. 44
Mongolism, congenital abnormalities met with in, Child. 5
—— —— heart disease in, percentage, Child. 5
Monro, Alexander, pupil of Boerhaave, Hist. 15
Montenegrin population deported by sea, stamping out pestilence among, Epid. 49, 50
Moore, B., F.R.S.—Discussion on the incidence of industrial tuberculosis, Epid. 145
—— and Roaf, H. E., aggregations of hæmoglobin and chloroform outside body, Anæsth. 25
—— ——, vapour pressures of chloroform, quoted, Anæsth. 17
Moore, Irwin.—Complete paresis of the left vocal cord due to a mediastinal growth, Laryng. 49
——, discussion on actinomyces in crypt of tonsil, Laryng. 162
—— —— on carcinoma of fauces treated by per-oral excision, followed by diathermy, Laryng. 131
—— —— on cases of stenosis of glottis, Laryng. 77
—— —— on dental cyst involving nose, Laryng. 160
—— —— on epithelioma of ethmoidal labyrinth, lateral rhinotomy, Laryng. 34
—— —— on foreign body impacted in trachea, Laryng. 129
—— —— on large submaxillary calculus, Laryng. 157
—— —— on naso-antral polypi, Laryng. 126
—— —— on removal of epithelioma of larynx, Laryng. 150, 153
—— —— on repair of nose by paraffin injection, Laryng. 136
—— —— on surgical diathermy, Electr. 45
—— —— on tooth impacted in secondary bronchus, Odont. 108
——, left recurrent laryngeal nerve paralysis in a patient suffering from tuberculosis, Laryng. 167
——, lupoid tuberculosis of the nose and larynx in girl, aged 17, Laryng. 22
—— —— —— of the pharynx affecting the soft palate and uvula, in a boy, aged 8, the subject of congenital syphilis, Laryng. 2, 39
——, malignant disease of the larynx, Laryng. 83
——, primary carcinoma of the nasopharynx, Laryng. 1
——, retention of cyst of the nasal floor, Laryng. 59
——, salivary calculus, Laryng. 81
——, tertiary syphilis of the pharynx in a female, aged 44, clinically resembling tuberculosis of a lupoid type, Laryng. 4, 47, 140
Moore, Sir W., account of Indian famine, quoted, Epid. 83
Mooren's ulcer, case (F. A. C. Tyrrell), Ophth. 7
—— ——, with denudation of cornea, Ophth. 7
Morbidity records, study of, necessity for, in relation to prevalence of industrial tuberculosis, Epid. 139, 140
Morgagni, discovery of foramen cæcum, question of priority (C. G. Cumston), Hist. 49
Morgan, Sauer and Schlesinger, treatment of fractures, quoted, Odont. 29, 30
Morison's paste, application after mastoid operations, risks and disadvantages of, Otol. 3
Morphia [morphine], administration, avoidance in cases of sepsis, malaria or heart disease, Anæsth. 6
—— —— valuable in cases of modified or chronic shock, Anæsth. 6
—— and atropine, preliminary injection in administration of ether in home military hospitals, Anæsth. 5
——, see also *Scopolamine-morphine* narcosis

Morphœa guttata, history of measles in cases of, Derm. 27
—— ——, striæ et maculæ atrophicæ, case (G. W. Sequeira), Derm. 94
—— ——, treatment, Derm. 27
—— ——, two cases (S. E. Dore), Derm. 26
Morphœo-sclerodermia, multiple, case (George Pernet), Derm. 9
Morris, Sir Malcolm, K.C.V.O.—Case of persistent erythema (exhibited by S. E. Dore), Derm. 60
Morrow, P. A., keratosis follicularis, quoted, Derm. 36, 37
Mortality, proportionate, value of, in investigating mortality data, Epid. 138, 139
Morton, Reginald.—Abnormal condition of the œsophagus, stomach and colon, Electr. 16
——, hair-ball in the stomach, Electr. 15
Morton, W. T. G., introducer of surgical anæsthesia, Hist. 66, 67
——, original essays of, Hist. 66, 67
Mosher's operation for pharyngeal pouch, Laryng. 61
Mosquitoes, campaign against, proper method of conducting, Epid. 17, 18
Motor, electric, circular saws used in obtaining bone-graft from tibia driven by, Odont. 45
Mott, F. W., F.R.S., on asylum dysentery, quoted, Epid. 77
——, changes in bone following irritation of nerves, quoted, R.S.M. Lect. 17
——, effect of high explosives upon central nervous system, quoted, Path. 118
Mould fungus, description of, Odont. 93, 94
—— ——, destruction of dentine by, Odont. 94, 96, 99
—— ——, invasions of dentinal tubes by, Odont. 94, 95
—— ——, microscopical appearances, Odont. 96, 97
—— ——, teeth invaded by, from Costa Rica, Odont. 94, 95
—— —— —— ——, from Ireland, Odont. 96, 97
—— ——, tooth invaded by, section of, Odont. 95
Mount Bleyer's epiglottis lifter, Laryng. 65
Mountain-climbers, muscular work done by, Epid. 57
Mouth-breathing from presence of naso-pharyngeal fibroma, deafness absent, Otol. 32
Mouth, exposure of antral cavities in, and total loss of hard palate, case (W. Kelsey Fry and G. S. Hett), Laryng. 90
——, hygiene of, in jaw injuries, Odont. 13, 15
Movement and position, sense of, how subserved, Neur. 32
Movements, measured, loss of appreciation in lesions of sensory cortex, Neur. 23
Moxon, Frank.—Luminous type for estimating the light sense in night blindness, Ophth. 11
Mucocele of ethmoid and left frontal sinus, orbital tumour consisting of, Laryng. 115
Mudros, prevalence of enterica in (1915), Epid. 9
Mummery, J. Howard.—Discussion on after-death destruction of teeth and bones by mould fungus, Odont. 99
——, on the tubular enamel of marsupials, Odont. 49
Mumps, epidemics in young soldiers, prophylaxis against, Epid. 54, 55
——, prevalence in Eastern campaigns, Epid. 29
Munition workers, English, daily amount of protein, fat and carbon consumed by, Epid. 70
—— ——, essential cause of acute or subacute yellow atrophy in, Epid. 166, 167
—— ——, tri-nitro-toluene poisoning in, epidemiology (W. J. O'Donovan), Epid. 149-168
Muscle, clonic contractions in relation to diagnosis of local tetanus, R.S.M. Discussion 10
—— contracture, cerebral, R.S.M. Discussion 7
—— ——, due to tetanus toxin, R.S.M. Discussion 10, 11
—— ——, false, R.S.M. Discussion 7
—— —— following anaërobic infection of wounds, R.S.M. Discussion 10, 11
—— —— —— injuries in civil life, R.S.M. Discussion 6, 11, 17, 18, 20
—— —— —— injury, R.S.M. Discussion 1-24 (F. W. Andrewes, 14; F. E. Batten, 11; Sir Anthony Bowlby, 19; Maj.-Gen. Sir David Bruce, 1, 20; R. C. Elmslie, 16; Sir Kenneth Goadby, 11; Wilfred Harris, 2, 15; C. H. Hinds Howell, 18; C. S. Sherrington, 18; R. H. Jocelyn Swan, 4; H. Campbell Thomson, 18; Dr. Worster-Drought, 5)

Muscle contracture following injury, increased deep reflexes in, R.S.M. Discussion 9
—— —— —— ——, issue of inquiry circular, R.S.M. Discussion 6, 8
—— —— —— ——, question whether due to local tetanus, R.S.M. Discussion 9
—— —— —— ——, reasons for greater incidence in war, R.S.M. Discussion 12, 20
—— ——, hysterical, R.S.M. Discussion 8, 9
—— —— ——, following injury, R.S.M. Discussion 2, 3
—— —— —— —— wound, R.S.M. Discussion 2, 3
—— —— ——, method of overcoming, Neur. 41
—— —— ——, treatment of subjects of, R.S.M. Discussion 19
—— ——, myogenic, R.S.M. Discussion 7
—— —— ——, causes, R.S.M. Discussion 7
—— ——, real, R.S.M. Discussion 7
—— ——, reflex, R.S.M. Discussion 8, 9
—— —— ——, theory as to, R.S.M. Discussion 8
—— ——, spinal, R.S.M. Discussion 7
——, unstriped, of urinary tract, effect of scopolamine on, Obst. 3
Muscles, anti-gravity, proprioceptive reaction of, Neur. 31
——, clonic and tonic spasm of, associated with pain, diagnostic symptom of local tetanus, R.S.M. Discussion 15, 16, 17
—— —— spasm of, becoming tonic, R.S.M. Discussion 17
—— —— ——, diagnostic symptom of local tetanus, R.S.M. Discussion 12
——, contracted, contractions superimposed upon, R.S.M. Discussion 10
——, contraction, centre for control of, R.S.M. Discussion 10
——, effect of severance of nerves on, Electr. 33
——, elasticity of, maintenance, Electr. 32
——, paralysed, mobility of joints necessary in case of, Electr. 33, 34
——, reflex action, centre for control of, R.S.M. Discussion 10
——, spasm of, followed by hysterical deformities, R.S.M. Discussion 17, 19
—— ——, local, following injury, late supervention, R.S.M. Discussion 19
——, spread of inflammation to, by internal scar of painful amputation stumps, R.S.M. Lect. 16, 17
—— to which reflex tonus is distributed, Neur. 31
——, tonic, persistent spasm, diagnostic of local tetanus, R.S.M. Discussion 13
——, with injured nerve supply, fibrous or fatty degeneration of, Electr. 30
—— —— —— ——, lack of nutrition in, Electr. 29
—— —— —— ——, production of contractions in, by electricity, Electr. 30, 32, 34
—— —— —— ——, re-education, Electr. 31, 32
—— —— —— ——, treatment by electricity, contractures developing during, Electr. 32, 35
—— —— —— —— —— by massage, Electr. 31, 32
—— —— —— —— —— postural, Electr. 32
—— —— —— —— —— ——, combined with mobilization, Electr. 32, 33
Muscular atrophy associated with lesions of sensory cortex of brain (L. Guthrie), Neur. 21
—— —— —— —— —— —— ——, ætiology discussed, Neur. 24-26
—— —— —— —— —— —— ——, development and course, Epid. 22
—— —— —— —— —— —— ——, limbs specially affected, Neur. 22
—— —— —— —— —— —— ——, preceded by motor paresis, Neur. 22, 25
—— ——, spinal, disturbance of nutrition with, case exhibiting, Neur. 26
—— tonus, nature, Neur. 31
—— work done by mountain climbers, Epid. 57
Musculo-spiral nerve, injury to, prognosis after operation, Electr. 35
Mutism in soldiers, Laryng. 182, 184
Mutton bone, piece of, removed from entrance to œsophagus (Sir W. Milligan), Laryng. 52
Mycosis fungoides and coccogenic eruption, difficulty of differentiation between, in diagnosis of case of extensive dermatitis, Derm. 77
—— ——, case (W. Knowsley Sibley), Derm. 93

Mycosis fungoides, see also *Erythrodermia*, pre-mycotic
Myiasis of ear (E. B. Waggett), Otol. 14
Myoma complicated by cancer of body of uterus, treatment by amputation at cervix uteri. Obst. 54
—— —— by undiagnosed cancer of body of uterus treated by total abdominal hysterectomy (H. R. Spencer), Obst. 48
—— —— —— —— —— —— —— —— —— ——, cases, Obst. 48-53
Myopathic origin of so-called functional aphonia, Laryng. 164
Myopes, new form of bi-focal for (P. C. Bardsley), Ophth. 16
Myositis due to irritative effect of scar tissue of wounds and amputation stumps, Electr. 52
Myotonia, case (Reginald C. Jewesbury), Child- 58

Nævus, case of, treatment by X-rays (E. P. Cumberbatch), Electr. 13
——, extensive, of trunk and extremities, involving palms and soles, case (George Pernet), Derm. 9
——, treatment by application of carbon dioxide, Electr. 46, 48
—— —— by diathermy, Electr. 42, 46, 47
Naphthalene powder as preventive against lice, Epid. 35
Narcotic, employment in spontaneous physiological births, requirements, Obst. 4
—— substance and cell proteins, adsorption between, Anæsth. 15
Nasal obstruction, effect of forced nasal respiration on, Otol. 38, 45
—— —— in aviators and gunners, effect on equilibration, Otol. 2
—— —— in bird-beak type of nasal deformity, Laryng. 107, 108
—— —— in children, Otol. 29
—— ——, presumed cause of rarefaction of air (negative pressure) in post-nasal space, Otol. 28, 29
—— ——, pure, without deafness or ear disease, Otol. 28, 29, 41
—— ——, removal of enlarged inferior turbinals causing, Otol. 37
—— ——, treatment by removal of spurs of septum, Otol. 37, 38
—— ——, with little affection of hearing, Otol. 33
—— spine, new, attempt at making, Laryng. 102
—— stenosis, anterior, due to syphilis or lupus, impairment of hearing rare in, Otol. 28
—— ——, simple, question of deafness in children with, Otol. 29
—— tube, administration of chloroform and oxygen through, Anæsth. 11
—— ——, anæsthetization by, Anæsth. 11, 12
Nasopharyngoscope, Valentine Holmes's modification, Laryng. 50, 51
Nasopharynx, adenoid tissue of, percentage in those free from and those suffering with pulmonary tuberculosis, compared, Laryng. 3, 4
——, carcinoma of, primary (Irwin Moore), Laryng. 1
—— —— ——, colloidal copper in successful treatment of, Laryng. 1
——, fibroma, with mouth-breathing, deafness absent, Otol. 32
—— "fibrosarcoma" of (Norman Patterson), Laryng. 80
——, growth of, case for diagnosis (Buckland Jones), Laryng. 55
——, pus from latent mastoid abscess evacuating into, Otol. 58, 59
—— —— —— —— —— —— ——, cases recorded, Otol. 59
——, teratoid growth or hairy polypus of, case (A. Brown Kelly), Laryng. 57
——, tumour of, case (W. Stuart-Low), Laryng. 119
Navy, Italian, rationing of, reform in, Epid. 42, 43
——. ——, syphilis in, prophylactic measures against, Epid. 50
Neck and larynx, shrapnel wound of, case (W. Stuart-Low), Laryng. 179
——, cancerous glands of, treatment by diathermy, Electr. 47
——, extrinsic cancer of larynx, four years after operation through side of (Sir StClair Thomson), Laryng. 127
——, gunshot wounds of, followed by paralysis of vocal cords, Laryng. 181

Neck, shrapnel embedded in (W. Stuart-Low), Laryng. 120
—— —— —— ——, question of leaving shrapnel embedded in tissues, Laryng. 179, 193, 194
——, tuberculosis in, X-ray treatment beneficial, Electr. 12
Needles for lumbar puncture in intrathecal injection of antitetanic serum, R.S.M. Discussion 24
Negative pressure, term criticized, Otol. 33, 41, 42
—— ——, term defended, Otol. 38
—— —— —— defined and explained, Otol. 44
—— —— in post-nasal space, see *Air*, rarefaction
Negroid-Mongoloid facies, congenital heart disease in mentally defective child with (F. Parkes Weber), Child. 3
Nephritis, interstitial, and horseshoe kidney in osteomalacia and infantilism, case (H. C. Cameron), Child. 22
Nerve bulb, showing inflammatory nodule, R.S.M. Lect. 10, 11
—— bulbs, painful, in amputations of upper arm, R.S.M. Lect. 21
—— ——, tender, excision, R.S.M. Lect. 22
—— crushing with appendix clamp, R.S.M. Lect. 12
—— ending, contracting cap of fibrous tissue over, whence derived, R.S.M. Lect. 10, 11
—— endings, different shapes of, dependent on preservation or not of epineurium, R.S.M. Lect. 11
—— ——, healing, stages of, R.S.M. Lect. 9
—— —— —— ——, inflammation and compression, R.S.M. Lect. 11-13
—— —— —— ——, regeneration, R.S.M. Lect. 11, 13
—— fibres, regeneration, R.S.M. Lect. 13
—— —— ——, abnormal course, R.S.M. Lect. 13
—— —— ——, causing pain in amputation stumps, R.S.M. Lect. 15
—— irritation, atrophic and inflammatory changes in bone following, R.S.M. Lect. 17
——, laryngeal, left recurrent, paralysis of, in patient suffering from tuberculosis (Irwin Moore), Laryng. 167
—— ——, recurrent, divided, repair of operation for, Laryng. 191, 192
—— —— ——, injury to, in operation for enlarged thyroid, Laryng. 190
—— —— ——, paralysis, Laryng. 192, 199
—— —— —— ——, treatment, Laryng. 189, 192
—— leaks, situation of, Electr. 23, 25
—— lymphatics, products of irritation from ligatures carried to, R.S.M. Lect. 10
—— regeneration, Electr. 51
—— —— purposeless in amputation stumps, Electr. 51, 52
—— roots, spinal, anterior, injury to one or more by missile lodged in body of vertebra without affecting posterior roots, Neur. 28
—— —— ——, destruction from shell wound, Neur. 28
—— —— ——, posterior, and posterior columns of spinal cord, lesions of, in association with muscular hypotonia and changes in nutrition (George Riddoch), Neur. 31
—— —— —— —— and spinal cord, close association of sensory and non-sensory afferent paths in, Neur. 32
—— —— —— —— changes in nutrition following, Neur. 36
—— —— —— ——, injury to, with muscular hypotonia, effects on sensation, Neur. 33, 34
—— —— —— ——, lesion of, how diagnosed, Neur. 36
——, sixth, paralysis of, in subacute mastoiditis (P. Watson-Williams), Otol. 62
——, vestibular, irritation vertigo due to, method of relieving, Otol. 23
Nerves, cut or damaged, galvanometer deflexions absent in case of, Electr. 24, 28
——, division by "swinging-door" method, R.S.M. Lect. 11, 12, 23
——, fibrous tissue surrounding, methods for removal, Electr. 35
——, peripheral, fibrous tissue round, relief of pain from, Electr. 36
—— ——, injury to, diagnosis, Electr. 33
—— —— ——, forms assumed by, Electr. 29, 30

Nerves, peripheral, injury to, prognosis after operation, Electr. 34
—— —— ——, treatment by diathermy, Electr. 33, 34
—— —— —— —— of cases with (Noel H. M. Burke), Electr. 29
—— ——, lesions of, how diagnosed, Neur. 36
—— ——, recovery after suture following operation, time required for, Electr. 33, 36
—— ——, severance of, effect on muscles, Electr. 33
——, regeneration of, new formation invading neighbouring structures, R.S.M. Lect. 22
——, removal, by epineural sleeve, R.S.M. Lect. 22
——, strangulation of, situation, R.S.M. Lect. 11
Nervous disorders, functional, in soldiers, deterrents to recovery from, Neur. 46
—— —— —— ——, mistaken for organic diseases, Neur. 43
—— —— —— —— suffering from, treatment (E. G. Fearnsides), Neur. 42
—— —— —— ——, treatment by baths, Neur. 48
—— —— —— —— —— by hypnotism and suggestion, Neur. 48
—— —— —— —— —— by massage and electricity, Neur. 48
—— —— —— —— ——, essentials of (E. G. Fearnsides), Neur. 42
—— —— —— —— ——, in special hospitals, Neur. 44
—— —— —— —— ——, psychological, Neur. 46
—— —— ——, two groups of patients suffering from, Neur. 45
—— system, action of scopolamine on, Obst. 3
—— ——, central, effect of high explosives on, Path. 118
—— —— ——, tremors of vocal cords during, Laryng. 147
—— ——, functional disease, diagnosis of local tetanus from, R.S.M. Discussion 18, 20
—— ——, influence on nutrition of tissues, special agency discussed, Neur. 26
—— ——, wounds of, cases (Henry Head), Neur. 27
Neurasthenia, galvanometer deflexions in, Electr. 25, 27
Neurasthenics, best mode of treatment for, Neur. 45
Neuritis, ascending, R.S.M. Lect. 14
Neuromata (amputation), characteristics of (G. Marinesco), R.S.M. Lect. 5
Neuro-retinitis after chicken-pox (L. Paton), Ophth. 12
Neuroses, failure in war adaptation leading to, Psych. 28
—— in soldiers, prominent factor in production of, Psych. 2
——, laryngeal, warfare, due to shell shock, Laryng. 182
—— ——, examination of subjects of, Laryng. 194
—— ——, warfare, excessive smoking by subjects of, Laryng. 193
—— —— ——, treatment, Laryng. 182-185, 187
——, nasal, little understood subject, Laryng. 26
—— of war, cinematograph demonstration of (A. F. Hurst), Neur. 39
——, pathogenesis, characteristic work of, Psych. 31
——, production of, repressed wishes in relation to, Psych. 31
——, Freud's theory of, Psych. 18, 20
—— —— ——, in relation to war shock (Ernest Jones), Psych. 21
—— —— —— —— —— ——, how exemplified, Psych. 29, 30
—— —— —— —— to wish-fulfilment, Psych. 30
—— —— ——, main principles of, formulated, Psych. 29-31
Neurosis, definition of, Psych. 33
——, factors in causation of any one, Psych. 31
——, functional, acrocyanosis (erythromelalgia), as, Child. 26
——, repressed, sexual desires finding expression in, Psych. 29
——, wish producing, in conflict with ego ideal, Psych. 31
——, wishes concerned in production of any one, Psych. 32
Neurotic symptoms mistaken for malingering, Psych. 29, 30
—— ——, volitional origin, Psych. 29, 30
Newly born, purpura in, Child. 43, 44
New Zealand forces, outbreak of typhoid fever among (1915), Epid. 11

Nicloux, percentages of chloroform in blood-constituents, quoted, Anæsth. 22

NICOLL, MAURICE.—Discussion on repression of war experience, Psych. 18

Night blindness, luminous type for estimating light sense in (F. Moxon), Ophth. 11

Night-time, painful elements of mental content exaggerated at, Psych. 13

Nitrogen in diet, minimum daily requirements, Epid. 58

Nitrous oxide, administration in home military hospitals, Anæsth. 5

—— —— —— in orthopædic cases, Anæsth. 8

—— —— anæsthesia, intranasal frontal sinus operation under (Dan McKenzie), Laryng. 137

—— —— and ether, administration in home military hospitals, Anæsth. 11

—— —— and oxygen, continuous administration in cases of chronic shock and sepsis, Anæsth. 6

—— —— gas cylinders, new foot-key for (O. Millauro), Anæsth. 28

—— —— ——, oxygen, ether, and warmed ether (combined) apparatus (C. T. W. Hirsch), Anæsth. 29

—— —— —— —— —— outfit (H. E. G. Boyle), Anæsth. 30

Nodules, symmetrical, of vocal cords, three cases (E. D. D. Davis), Laryng. 116

NORTHCROFT, GEORGE.—Discussion on treatment of mandibular fractures, Odont. 47

——, short account of a year's work at one of the Jaw Injuries Centres of the London Command, Odont. 6

Nose, almost complete loss of tissues, treatment by sub-total rhinoplasty, Laryng. 89

——, discharges from, bacteriological examination in cases of deafness, Otol. 40

—— and ear, diseases of, connexion between, advocates of, catarrhalist school, Otol. 27, 28, 35

—— —— —— —— —— ——, rarefactionist school (negative pressure advocates), Otol. 28, 32, 38

—— —— ——, theory of independence one of the other (separatist school), Otol. 27

—— and larynx, lupoid tuberculosis of, in girl aged 17 (Irwin Moore), Laryng. 22

——, bridge of, upper quarter and upper half, methods of repair, Laryng. 88

——, carcinoma of, primary, treatment by colloidal copper, Laryng, 1, 6

——, deformity, bird-beak type, Laryng. 107

—— ——, pug-nose type, Laryng. 88, 107

——, dental cyst involving (E. D. D. Davis), Laryng. 159

——, diseases and abnormalities of, influence upon ear, discussion on, Otol. 25-46; (H. J. Banks-Davis, 44; James Donelan, 43; P. G. Goldsmith, 39; J. Dundas Grant, 38; Albert Gray, 33; C. Heath, 34; W. Hill, 25, 44; W. Jobson Horne, 40; T. Mark Hovell, 37; W. H. Kelson, 41; H. Lambert Lack, 32; N. Patterson, 31; U. Pritchard, 36; W. Stuart-Low, 40; Sir StClair Thomson, 32, 43; P. Watson Williams, 34; C. Woakes, 36)

—— —— —— —— ——, discussion at British Medical Association Annual Meeting (1900), Otol. 26, 27

—— —— —— —— ——, gradual recognition of, historically traced, Otol. 25, 26

—— ——, and eye diseases, relations between, awaiting further investigation, Laryng. 26

—— ——, associated with deafness, first observations, Otol. 26

—— ——, deafness independent of, Otol. 33

——, entire destruction, cases of failure and success in substitution, Laryng. 89

——, septic infection from, invading middle ear, Otol. 40, 43

——, floor of, cysts, contents, Laryng. 59

—— —— ——, large dental, involving (E. D. D. Davis), Laryng. 158

—— —— ——, and dental cysts, collection of (A. Brown Kelly), Laryng. 58

—— —— —— —— —— ——, differentiation between, Laryng. 58

—— —— ——, treatment, Laryng. 59, 60

—— ——, retention cyst of (Irwin Moore), Laryng. 59

——, gunshot wounds of, advancement of turbinals and septal swings in, cases (G. S. Hett), Laryng. 99-108

——, injuries to, in early stage, treatment by mechanical supports, Laryng. 88

Nose, injuries to, treatment at Jaw Injuries Centre, Odont. 12
——, lesions of, reflex influence on ear, Otol. 26, 31
——, lower third of, loss, method of repair, Laryng. 88
——, malignant disease of, prognosis, Laryng. 33
—— —— growths in, amenability to surgery, Laryng. 32
——, normal, three main elements, Laryng. 87
—— olives, Odont. 12
——, operations on, conditions under which deafness, tinnitus or giddiness are relieved by, Otol. 41
—— ——, employed for relief of deafness, Otol. 30
—— —— —— —— ——, when to be undertaken, Otol. 41, 42, 45
—— ——, in cases of deafness, testing of hearing before, Otol. 39, 40, 45
—— ——, otosclerosis commencing after, Otol. 39
——, papilloma of, case (G. W. Dawson), Laryng. 132
——, repair of, by paraffin injection (J. Donelan), Laryng. 135
—— —— —— ——, failures in, Laryng. 135, 136
—— (saddle-back), resulting from resection of septum (Sir StClair Thomson), Laryng. 20
—— ——, treatment by implantation of bone or cartilage, Laryng. 21
—— —— —— by paraffin injections, Laryng 20, 21
——, skin-grafting in, suggested as means of curing atrophic rhinitis, Laryng. 109
——, sunken in, case illustrating employment of autogenous costal cartilage graft for septal support (G. S. Hett), Laryng. 96
——, synechiæ of, breaking down by diathermy, Electr. 47
——, three main elements of, loss in gunshot injuries, Laryng. 87
——, tip of, loss, method of repair, Laryng. 87, 88
——, total loss of, case illustrating method of advancement of turbinals (G. S. Hett), Laryng. 94
——, vestibule, contraction, method of avoidance in operation for restoration of ala, tip and columella, Laryng. 105
—— with four nostrils, congenital deformity showing (Sir StClair Thomson), Laryng. 55
Nostrils, posterior, bony occlusion, deafness absent in, Otol. 28
Novarsenobillon, syphilitic rash appearing after twenty-three injections of (J. L. Bunch), Derm. 78
Nursing under twilight sleep, Obst. 29, 38, 40
Nutrition, changes in, and muscular hypotonia, associated with lesions of posterior columns of spinal cord and of posterior roots (George Riddoch), Neur. 31
—— ——, associated with lesions of sensory cortex of brain (Leonard Guthrie), Neur. 21, 22
—— —— —— —— —— —— ——, ætiology discussed, Neur. 24-26
—— ——, following injuries to posterior part of cervical enlargement of spinal cord, Neur. 36
—— —— —— —— —— to posterior spinal nerve roots, Neur. 36
——, disturbance of, in case of spinal muscular atrophy, Neur. 26
——, lack of, in muscles with injured nerve-supply, Electr. 29
—— of Belgian hand-workers, data as to, Epid. 67
—— of tissues, influence of nervous system on, special agency discussed, Neur. 26
Nystagmoid movements in pharynx, cases, Laryng. 143
—— —— —— and larynx. brain from patient presenting (A. Brown Kelly), Laryng. 141
—— —— —— —— ——, rarity, Laryng. 143

Obesity benefited by Cheltenham waters, Baln. 3
O'Brien, R. A.—Discussion on serum sickness, Med. 2
Obstetrics, practice of, first introduction of scopolamine-morphine narcosis into, Obst. 3
Occipito-posterior labour positions, percentage not rotating spontaneously with and without "twilight sleep" compared, Obst. 37, 38
Occupations arranged in descending order of incidence of pulmonary tuberculosis in reports of Registrar-General, Epid. 145, 148

Occupations of women in Leipzig district, death-rates of (1887-1901), Epid. 142

—— showing enhanced incidence of pulmonary tuberculosis, Epid. 146

O'Donovan, W. J.—Epidemiology of tri-nitro-toluene poisoning, Epid. 149-168

Œsophagus, dilatation, from cardiospasm, bronchoscopy and screen examination in, Laryng. 53

——, foreign body impacted in, removal of (G. C. Cathcart), Laryng. 83

——, fusiform dilatation of, coated with *Oïdium albicans* (Sir StClair Thomson), Laryng. 29

——, gunshot wounds of, bilateral, perforating, Path. 90

——, piece of mutton bone removed from entrance to (Sir W. Milligan), Laryng. 52

——, stomach and colon, abnormal conditions of (Reginald Morton), Electr. 16

Officers, military, war-neuroses in, principal aim of treatment, Psych. 16

Oïdium albicans coating fusiform dilatation of œsophagus (Sir StClair Thomson), Laryng. 29

Oil-ether, rectal administration, dosage, Anæsth. 12

—— —— —— in plastic face surgery, Anæsth. 9, 11, 12

Oligopnœa, children born during "twilight sleep" in condition of, Obst. 13

O'Malley, J. F.—Discussion on acute mastoiditis, Otol. 54

——, discussion on aural bacteræmia, Otol. 51

—— —— on case of orbital tumour, Laryng. 115

—— —— —— of orchitis and deafness, Otol. 80

—— —— on complete deafness and loss of labyrinth function, Otol. 13

—— —— on concentric narrowing of meatus, Otol. 66

—— —— on dental cysts involving nose, Laryng, 160

—— —— on depressed scar following mastoid operation, Otol. 56

—— —— on extreme alar collapse, Laryng. 130

—— —— on large submaxillary calculus, Laryng. 157

—— —— on operation on mastoid for acute suppurative inflammation followed by insertion of B.I.P., Otol. 74

—— —— on paralysis of arytænoideus, Laryng. 164

—— —— on repair of nose by paraffin injection, Laryng. 135

—— —— on warfare injuries and neuroses of larynx, Laryng. 186

——, transplantation of cartilage into the septum, Laryng. 139

Omentum, lesser, penetration by shrapnel bullet, encystment of bullet, Path. 99

Open-bite position, fixation of splint in fractures of mandible in, Odont, 32, 33, 34, 35, 36, 47, 48

—— —— —— of splint in fracture of mandible contrasted with closed bite position, Odont. 34-36

Operation wounds, scar tissue in, radium treatment. Laryng. 189, 190

Ophthalmoplegia (complete homolateral), hernia cerebri, avulsion of abscess wall following cerebral abscess, recovery (W. M. Mollison), Otol. 61

Optic disk and choroid, coloboma of (G. Harvey Goldsmith), Ophth. 10

—— ——, fibrous band stretching from old choroidal scar to (Malcolm L. Hepburn), Ophth. 8

Orbit, perithelioma of (H. R. Jeremy), Child. 50

——, tumour of, case (J. Gay French), Laryng. 115

—— —— ——, consisting of mucocele of ethmoid and left frontal sinus, Laryng. 115

Orchitis and deafness, case (Dan McKenzie), Otol. 79

Oriental sore, Epid. 24 ; see also *Leishmania*

Ormond, A. W.—Discussion on hysterical disorders of vision, Ophth. 15

——, note on the direct observation of the fundus oculi during a period of temporary blindness, Ophth. 5

Orthopædic surgery in home military hospitals, anæsthetics suitable for, Anæsth. 8

Orton, G. Harrison.—Necessity for education in radiology and electro-therapeutics, Electr. 1

Osler, Sir W., Bt., F.R.S.—Multiple hæmorrhagic telangiectases, quoted, Derm. 72

——, the first printed documents relating to modern surgical anæsthesia, Hist. 65-69

Osteogenesis imperfecta (fragilitas ossium, fœtal rickets) (Paul B. Roth), Child. 42

Osteoma of left frontal bone, Laryng. 74
Osteomalacia and infantilism, relation to delayed rickets, Child. 24
—— ——, with horseshoe kidney and interstitial nephritis, case (H. C. Cameron), Child. 22
—— ——, with renal deficiency, case (H. C. Cameron), Child. 23
—— sclerotica ("boomerang" bones), ætiology discussed, Path. 42, 43
—— —— —— ——, case of, gait of patient, Path. 38, 39
—— —— —— —— ——, history, Path. 36
—— —— —— ——, diagnosis from mollities ossium, Path. 42, 43
—— —— —— —— —— from rickets, Path. 42, 43
—— —— —— ——, geographical distribution, Path. 35, 36, 42, 43
—— —— —— ——, manifested by genu varum, Path. 44-46
—— —— —— ——, morbid anatomy, Path. 40
—— ——, sclerosing panosteitis of long bones preceded by softening and plasticity (J. B. Christopherson), Path. 35
Osteomyelitis, due to irritant effect of scar tissue of wounds and amputation stumps, Electr. 52
Otitis media, absence in cases of nasal polypus, Otol. 36
—— —— due to latent disease of sphenoidal sinus, Otol. 35
—— ——, latent sinusitis as source of, Otol. 35, 45
—— ——, simple catarrhal, Eustachian catarrh accompanying, Otol. 3
—— ——, suppurative, acute and subacute, loss of hearing due to delay in operating in (R. Lake), Otol. 60
Otological Research, report of Committee of (Section of Otology), Otol. 4
—— specimen, method of preservation, Otol. 5
Otorrhœa, double, recovery from, on removal of inferior turbinals, Otol. 34
Otosclerosis, commencing after operations on nose, Otol. 39
——, diagnosis, Otol. 3
——, nature of, Otol. 33
——, removal of spurs of nasal septum in, Otol. 37, 38, 41, 45
——, simulated, frequently, Otol. 3
——, symptoms, alleviation, Otol. 3
——, tinnitus of, treatment, Otol. 24
Ovary, dermoid of, endothelioma in, rarity, Obst. 64
Overcrowding, affecting prevalence of tuberculosis, Epid. 134
Oxygen, absorption by blood, Anæsth. 25
——, administration of, with ether and chloroform, apparatus for (Hugh R. Phillips), Anæsth. 13
—— and chloroform administration through nasal tube, Anæsth. 11
—— and mixture, administration in operations for spinal injury, Anæsth. 8
——, carriers for, Anæsth. 26
—— in blood, amount taken up by chloroform, Anæsth. 17
—— content in blood, fall in chloroform anæsthesia, Anæsth. 24, 25
—— —— ——, in chloroform narcosis, diminution, on what dependent, Anæsth. 26
Oxygenation, effect of heliotherapy in, Electr. 11

Pain and suffering, sensitiveness to, origin of, Psych. 26
—— as factor in causation of alopecia areata, Derm. 62
—— due to scar tissue of war wounds and amputation stumps, Electr. 50
—— —— —— —— —— —— —— ——, means of combating, Electr. 50
—— in amputation stumps, types of, R.S.M. Lect. 14
Palate and antrum, carcinoma of, excision of upper jaw for, followed by diathermy (N. Patterson), Laryng. 34
——, displacement, in fractures of mandible and maxilla, treatment, Odont. 22
——, effect of chronic rhinitis on, Otol. 26, 31

Palate, hard, total loss of, and exposure of antral cavities in mouth (W. Kelsey Fry and G. S. Hett), Laryng. 90
—— —— —— —— —— —— —— ——, method of fitting denture, Laryng. 90-94
——, malformations, irreducible, in fractures of maxilla, Odont. 20, 21
—— (soft and hard), tonsils and faucial pillars, extensive epithelioma affecting, treatment by diathermy, results (N. Patterson), Laryng. 23
—— ——, and posterior pharyngeal wall, adhesions between, breaking down by diathermy, Electr. 47
—— ——, and uvula, affected by lupoid tuberculosis of pharynx, in subject of congenital syphilis (Irwin Moore), Laryng. 21, 39
—— —— ——, epithelioma of (A. Wylie), Laryng. 110
—— ——, cancer of, treatment by diathermy, Electr. 48
—— ——, peculiar appearance of, in double perforation of septum nasi, case (H. J. Banks-Davis), Laryng. 167
——, total loss of, and exposure of antral cavities in mouth, structures used as means of attachment for artificial palate, Laryng. 90-94
——, tumour of, in child, aged 8 months, for diagnosis (James Donelan), Laryng. 134
Palms and soles involved in extensive nævus of trunk and extremities, case (George Pernet), Derm. 9
—— of hand, ichthyosis hystrix linearis of (S. E. Dore), Derm. 99
Panosteitis, sclerosing of long bones preceded by softening and plasticity (osteomalacia sclerotica) (J. B. Christopherson), Path. 35
Papillary ingrowths of lining endothelium of tumour on back of child, Path. 28, 29
Papilloma growing from wall of trachea, removal, Laryng. 53
—— of larynx (A. Wylie), Laryng. 139
—— of nose, case (G. W. Dawson), Laryng. 132
Papillomata, multiple, of larynx, in a child, tracheotomy and removal under suspension laryngoscopy (J. Dundas Grant), Laryng. 66
—— —— ——, removed by operation (suspension method) after tracheotomy, death 5 weeks later from acute membranous tracheitis and bronchitis (Hunter Tod), Laryng. 68
—— —— ——, treatment by radium or thorium, Laryng. 67
—— of bladder, treatment by diathermy, Electr. 46
Pappataci fever, see *Sandfly* fever
Paraffin, injection in repair of nose (J. Donelan), Laryng. 135
—— —— —— ——, failures in, Laryng. 135, 136
—— injections in treatment of saddle-back nose, Laryng. 20, 21
Paraldehyde, olive oil and ether, rectal administration in plastic face operation, Anæsth. 11
Paralysis agitans, tremors of vocal cords in, Laryng. 148
——, case of, advice of Boerhaave in, Hist. 3
—— of arytænoideus, case (H. J. Banks-Davis), Laryng. 163
—— of laryngeal recurrent nerve, treatment, Laryng. 189
—— —— —— —— (left), in patient suffering from tuberculosis (Irwin Moore), Laryng. 167
—— of left vocal cord, cases (W. H. Kelson), Laryng. 38, 79
—— of sixth nerve, recovering, in subacute mastoiditis, latent maxillary antral infection, case illustrating advantageous exploration of sinuses by suction syringe (P. Watson-Williams), Otol. 62
Paraphrenia, Pysch. 35
Paraplegia, hysterical, treatment, improved methods, Neur. 39-41
Paratyphoid A vaccine, immunity conferred by, duration, Epid. 11
—— fever (A and B), prevalence in Eastern campaigns, percentages, Epid. 10
Paresis, complete, of left vocal cord due to mediastinal growth (Irwin Moore), Laryng. 49
——, motor, preceding muscular wasting in post-antral lesions, Neur. 22, 25
Parietal lesion, resulting from bullet wound, with hypotonia and profound "feminine" appearance of affected hand, case, Neur. 27
Paris, siege of, deaths from infectious diseases during, Epid. 75

Paris, siege of, mortality of city during, Epid. 74
PARKINSON, J. PORTER.—Case for diagnosis, Child. 11
——, case of anæmia with unusual blood count, Child. 55
—— —— of primary sarcoma of lung, with specimens, Child. 19
——, congenital morbus cordis, ? patent ductus arteriosus, Child. 38
——, discussion on "botulism," Child. 52
—— —— on case of amaurosis following violent convulsions, Child. 2
—— —— —— of osteomalacia and infantilism, Child. 25
—— —— —— of myotonia, Child. 59
—— —— on congenital heart disease in mentally defective child, Child. 6
—— —— on enlarged suprarenals and sudden death in an infant, Child. 35
——, specimens of case of enlarged liver and spleen, Child. 33
Parotid fistula, fluid from salivary glands discharged by, Otol. 55, 56
—— —— of twelve months' duration (H. J. Banks-Davis), Otol. 55
—— glands, (?) tumour of, involving skin (H. G. Adamson), Derm. 73
PARROTT, A. H.—Discussion on work at a Jaw Injuries Centre, Odont. 25
PARSONS, J. HERBERT.—Discussion on changes in vitreous resulting from penetrating septic wounds, Ophth. 4
PATERSON, D. R.—Discussion on carcinoma of fauces treated by per-oral excision, followed by diathermy, Laryng. 131
——, discussion on case of double dacryocystitis, Laryng. 72
—— —— on dental cysts involving nose, Laryng. 159
—— —— on extreme alar collapse, Laryng. 130
—— —— on foreign body (collar stud) in left bronchus, Laryng. 72
—— —— on multiple papillomata of larynx, removal, death, Laryng. 70
—— —— on paralysis of arytænoideus, Laryng. 165
—— —— on pedunculated carcinoma of pharynx, Laryng. 124
—— —— on repair of nose by paraffin injection, Laryng. 135
—— —— on retention cyst of nasal floor, Laryng. 60
Pathology Committee, Section of Obstetrics and Gynæcology, report on Dr. Herbert Spencer's specimen of endothelioma in dermoid tumour, Obst. 64
PATON, LESLIE.—Discussion on case of Mooren's ulcer, Ophth. 8
——, discussion on hysterical disorders of vision, Ophth. 14
——, neuro-retinitis after chicken-pox, Ophth. 12
PATTERSON, NORMAN.—Discussion on extreme alar collapse, Laryng. 130
——, discussion on influence of diseases and abnormalities of nose on ear, Otol. 31
—— —— on pedunculated carcinoma of pharynx, Laryng. 124
—— —— on saddle-back nose consequent on resection of septum, Laryng. 21
—— —— on surgical diathermy, Electr. 44
——, excision of the retro-pharyngeal gland for recurring retro-pharyngeal abscess of tubercular origin, Laryng. 35
—— —— of the upper jaw for carcinoma of antrum and palate, followed by diathermy, Laryng. 34
——, "fibrosarcoma" of nasopharynx, Laryng. 80
——, result of treatment by diathermy of extensive epithelioma affecting the soft and hard palate, tonsils, and faucial pillars, Laryng. 23
—— and HILL, WILLIAM.—Carcinoma of fauces treated by per-oral excision, followed by diathermy, Laryng. 130
Peace-neuroses and war-neuroses, symptoms of each identical, Psych. 23, 24
——, transition of war-neuroses into, Psych. 36
Pearson, Karl, F.R.S., examples of epidemic curve, Type IV, described by, Epid. 87, 117, 119
PEGLER, L. H.—Case of aural fibroma, Otol. 67
——, case of hyper-adduction of the left arytænoid cartilage, Laryng. 12
—— —— of nasal fibroma (of the right fossa) with specimen and microscopic section, Laryng. 10

PEGLER, L. H.—Discussion on case of subacute mastoiditis with latent maxillary antral infection, Otol. 65
——, discussion on concentric narrowing of each meatus, Otol. 66
Pellagra among Armenian refugees in Egypt (1917), Epid. 28
Pelvis, floor of, preservation in respect of relative value of total abdominal and supravaginal hysterectomy, Obst. 57
Perichondritis of larynx (G. W. Dawson), Laryng. 133
—— ——, causes of death in, Laryng. 133
Perineuritis in amputated limbs, origin of, Electr. 52
Periodontal membrane, ionization of, in case of rheumatoid arthritis (E. Sturridge), Odont. 112
Perithelioma of orbit (H. R. Jeremy), Child. 50
PERMEWAN, WILLIAM.—Discussion on warfare injuries and neuroses of larynx, Laryng. 185
PERNET, GEORGE.—Case of acne agminata (of Radcliffe-Crocker), Derm. 10
——, case of acne varioliformis, Derm. 10
—— —— of acute generalized lichen planus treated by lumbar puncture, Derm. 81
—— —— of dermatitis herpetiformis, Derm. 99
—— —— of extensive nævus of the trunk and extremities, involving the palms and soles, Derm. 9
—— —— of lymphangioma tuberosum multiplex. Derm. 30
—— —— of multiple morphœosclerodermia, Derm. 9
—— —— of pre-mycotic erythrodermia (early mycosis fungoides), Derm. 97
—— —— of primary syphilitic chancre of the umbilicus, Derm. 23
—— —— of prurigo diathésique de Besnier, Derm. 67
——, discussion on case of lupus erythematosus, Derm. 5
—— —— on syphilitic rash appearing after twenty-three injections of novarsenobillon, Derm. 79
PETERS, E. A.—Cases of gunshot wound of larynx, Laryng. 177
——, discussion on warfare injuries and neuroses of larynx, Laryng. 186
Petroleum spray as preventive against lice, Epid. 35
Phagedæna, starting point of, Derm. 22
Phagocytes, opacities in vitreous due to mild infections composed of, Ophth. 3
Pharyngeal pouch, recurrence, prevention, Laryng. 61
—— ——, treatment, operative, Laryng. 60, 61
—— —— —— ——, by dissection, Laryng. 60-63
—— —— —— ——, by diverticulo-pexy, (W. Hill), Laryng. 60
—— —— —— ——, by inversion of pouch into pharynx, Laryng. 61
—— —— —— ——, Mosher's method, Laryng. 61
Pharynx and larynx, nystagmoid movements in brain from patient presenting (A. Brown Kelly), Laryng. 141
——, cancer of, treatment by diathermy, Electr. 43, 46, 47
——, changes in, following gassing, Laryng. 188
——, lupoid tuberculosis of, affecting soft palate and uvula, in boy aged 8, subject of congenital syphilis (Irwin Moore), Laryng. 32, 39
—— —— —— —— —— —— —— —— —— —— —— —— —— ——, blood examination, Laryng, 41
—— —— —— —— —— —— —— —— —— —— —— —— —— ——, examination of larynx and lungs, Laryng. 40, 41
—— —— —— —— —— —— —— —— —— —— —— —— —— ——, treatment by injection of tuberculin, Laryng. 39
——, nystagmoid movements in, Laryng. 143
——, pedunculated, carcinoma of (specimen and slide) (A. Brown Kelly), Laryng. 123
——, sarcoma of, treatment by diathermy, Electr. 47
——, tertiary syphilis of, in female, aged 44, clinically resembling tuberculosis of lupoid type (Irwin Moore), Laryng. 4, 47, 140

Pharynx, tuberculosis of, relative rarity, Laryng. 3

——, tumour of (G. W. Dawson), Laryng. 134

Phillips, Hugh R.—Demonstration of apparatus for administering oxygen with ether and chloroform, Anæsth. 13

Phonation, attempted, in functional aphonia, variations in position of vocal cords, Laryng. 182

Physical methods, treatment of functional nervous disorders in soldiers by, Neur. 48

—— and breathing exercises in treatment of functional aphonia, Laryng. 198

Pickerill, H. P.—Arthroplasty of temporo-mandibular joint for ankylosis, Odont. 87

——, discussion on treatment of mandibular fractures, Odont. 47

——, screw-lever splint, Odont. 90

Pigmentation, increase in tuberculous subjects a prognostic sign, Electr. 10

——, little capacity for, in tuberculous subjects, Electr. 10

——, production by ultra-violet radiation, Electr. 9, 10

——, protective rôle of, Electr. 10

—— under heliotherapy, Electr. 10

Pinch, A. E. Hayward.—Discussion on warfare injuries and neuroses of larynx, Laryng. 189

Pinoy, description of *Accladium Castellanii*, Derm. 14

Pipette, graduated, emulsion expelled from, prevention of error in estimating amounts, M.B.L. 5

—— ——, use in enumeration of *Microfilaria nocturna* in blood and urine, M.B.L. 5

—— —— —— —— of protozoa, M.B.L. 5

—— —— —— —— ——, employment of concentration methods, when necessary, M.B.L. 5

Pistol bullet wound, fissured, of left lobe of liver, Path. 51

Pittville water, Cheltenham, composition, Baln. 2

—— —— ——, hepatic affections benefited by, Baln. 5

Pituitrin, injection into patients under "twilight sleep," Obst. 10, 25, 26

Pityriasis rosea, syphilide with resemblance to (E. G. Graham Little), Derm. 57

—— —— with unusual features, case (H. G. Adamson), Derm. 39

Placenta, birth of, under "twilight sleep," Obst. 31, 35

Plague as test of epidemiological theory, Epid. 89

—— at Eyam, Derbyshire (1666), Epid. 130

——, brief review of statistical literature regarding, Epid. 112

——, certain aspects of, theory of epidemiology in special relation to (John Brownlee), Epid. 85

——, epidemics, Alexandria (1835-43), course of, showing pseudo-periodicity, Epid. 104, 105

—— ——, Allahabad, humidity in relation to size of, Epid. 107

—— —— —— 1902-3, 1903-4, 1904-5, 1906-7, values of constants for, Epid. 108

—— ——, Belgaum (1897-1904), correlation between β_2 and total number of deaths, Epid. 110

—— ——, Bombay, change of date of mean in, Epid. 100, 101

—— —— —— (1891-1913), correlation between β_2 and total number of deaths, Epid. 110

—— —— —— districts, values of β_1 and β_2 for black rat, brown rat, and man, Epid. 95-97, 112

—— —— —— (1908-11), values of β_1 and β_2 and date of mean of epidemic for black and brown rat and man, Epid. 97

—— ——, Calcutta (1901-9)., correlation between β_2 and total number of deaths, Epid. 110

—— ——, Hong-Kong (1893-1904), correlation between β_2 and total number of deaths, Epid. 110

—— ——, London (1637-46), course of, Epid. 101, 103

—— —— —— (1665), course not apparently altered by emigration, Epid. 90

—— —— —— ——, curve of, Epid. 91

—— —— —— records, how far reliable, Epid. 90

—— ——, Poonah (1897-1906), correlation between β_2 and total number of deaths, Epid. 110

—— —— —— (1899), mortality, when greatest, Epid. 131

—— —— —— (1899-1908), course of, Epid. 100, 102

—— —— and epizootics, Bombay (1907-11), correlation between number of deaths in man and number of deaths in black and brown rats during fortnight preceding, Epid. 111

Plague epidemics, climate in relation to, Epid. 128
—— ——, course of, studied in villages, Epid. 128, 129
—— ——, curve describing (Prof. Karl Pearson's Type IV), Epid. 87
—— ——, distribution through any one season, Epid. 128
—— ——, form and size of, relation between, Epid. 109, 110
—— ——, form of, in relation to size of population, Epid. 132
—— —— in man in certain large towns, table showing values of symmetry and asymmetry and form of curves for (β_1 and β_2), Epid. 92
—— ——, law of, components, Epid. 128
—— ——, periodicity in, Epid. 100
—— ——, suppression by evacuation of population, Epid. 130, 131
—— ——, symmetry and asymmetry of, Epid. 109
——, epizoötic and epidemic, difference between, Epid. 89
—— ——, in rats, Epid. 93
—— —— ——, cessation of, theories discussed, Epid. 98, 99
—— —— —— in Bombay, mortality, Epid. 94
—— —— —— ——, seasonal incidence, Epid. 94
—— —— ——, Sydney (1903-7), course of, Epid. 102, 104
——, greater incidence among brown rats in Bombay, Epid. 94, 97
——, immunity of rats to, after cessation of epizoötic, evidence for, Epid. 98
—— in man and in rats, relation between, Epid. 110
—— in relation to humidity, Epid. 106, 107, 113, 128, 129
—— —— to temperature of air, Epid. 106, 113, 128, 129
——, method of entry into localities, Epid. 113
——, pneumonic, epidemic in Manchuria (1911), Epid. 131
—— —— —— —— ——, fatality of cases almost absolute, Epid. 131
—— —— —— —— ——, suppression of, means adopted for, Epid. 131
——, relation of weather to, Epid. 105, 128, 129
——, transmission by fleas, Epid. 89, 98, 106, 108, 112
—— —— —— ——, in India, Epid. 129
—— ——, various modes of, Epid. 113
Plastic face surgery in Home Military Hospitals, methods of anæsthetization suitable for, Anæsth. 8, 10, 12
—— operations in jaw injuries, care in, Odont. 18
Plating in fractures of mandible, with small loss of tissue, Odont. 39, 40
Plethysmograph used for ventilation of blood during chloroform and ether anæsthesia, Anæsth. 25
Pneumonia, deaths from, during siege of Paris, Epid. 75
Pohl, transport of chloroform from lungs by red corpuscles, quoted, Anæsth. 32
Polio-encephalitis, suggested diagnosis of, in cases of "botulism," Child. 52, 53
Polyneuritis, toxic, of the trenches, Neur. 29
Polypi (naso-antral) with antral attachment, specimens (A. Brown Kelly), Laryng. 125
Polypus, choanal, principal site of origin, Laryng. 126
——, hairy, or teratoid growth of nasopharynx, case (A. Brown Kelly), Laryng. 57
——, nasal, absence of otitis media in, Otol. 36
—— ——, deafness rare in, Otol. 29
Poonah, plague epidemics, correlation between β_2 and total number of deaths, Epid. 110
—— —— —— (1899-1908), course of, Epid. 100, 102
—— —— —— (1899), mortality, when greatest, Epid. 131
—— —— ——, values of β_1 and β_2 (symmetry and asymmetry, and form of curves) for, Epid. 92, 93
Porter, Miss A., enumeration of cysts of *Giardia* (*Lamblia*) *intestinalis*, M.B.L. 2
Position and movement, sense of, how subserved, Neur. 32
Post-mortem examinations, skilled, importance in fatal cases of aplastic anæmia, Epid. 157
—— reports of Dr. Matthew Baillie (1813-21) (R. Hingston Fox), Hist. 79

Post-nasal space, endothelioma of (W. H. Jewell), Laryng. 81
—— ——, growths in, causing deafness, Otol. 29
—— ——, rarefaction of air in (negative pressure) claimed as due to nasal obstruction, Otol. 28, 29
Postural tonus, reflex system underlying, situation of controlling centres, Neur. 31
Posture in physical and breathing exercises in treatment of functional aphonia, Laryng. 198
——, sense of, loss in lesions of sensory cortex, Neur. 23
Potassium iodide, administration shortly before iodine ionization of war wounds, Electr. 55
—— —— and mercury in enlargement of liver and spleen, Child. 13, 14
—— ——, bromide of potash and syrup of glyco-phosphate in relief of Ménière's symptoms, Otol. 20
—— —— in accladiosis, Derm. 17
—— —— in relief of aural vertigo, Otol. 23
Potatoes, calorie value in diet at Millbank Penitentiary, Epid. 78-80
——, protein value of, Epid. 57
Potts, W. A.—Discussion on scopolamine-morphine narcosis in childbirth, Obst. 33
Power, D'Arcy.—John Halle and sixteenth century consultations, Hist. 55
——, the letters of Boerhaave to Cox Macro, Hist. 21
——, motor inhibition of intestine following injury, quoted, Path. 102
Pre-cancerous lesions, experimental production, Path. 17
Pre-tracheal abscess of acute development, in a middle-aged woman, producing dysphagia and dyspnœa (J. Dundas Grant), Laryng. 72
Priests, alliance of primitive medicine man with, Hist. 47, 48
Pringle, J. J.—Case for diagnosis, possibly an early case of the miscalled multiple idiopathic hæmorrhagic sarcoma of Kaposi, Derm. 107
——, discussion on acute generalized lichen planus treated by lumbar puncture, Derm. 81
—— —— on adenoma sebaceum, vascular or telangiectatic (Pringle) type, Derm. 25
—— —— on case for diagnosis, Derm. 84, 104
—— —— —— of extensive dermatitis, Derm. 78
—— —— —— of multiple rodent ulcer with X-ray burns, Derm. 44
—— —— —— of syphilitic rash appearing after twenty-three injections of novarsenobillon, Derm. 80
—— —— —— of ulcus molle serpiginosum, Derm. 22
Printers, pulmonary tuberculosis in, mortality rates, ages 35-45 (1900-1902), Epid. 144
Printing trade, incidence of pulmonary tuberculosis in, Epid. 146
—— —— —— —— ——, lessening of, Epid. 146
Pritchard, Eric.—Case of amaurosis following violent convulsions, Child. 1, 14
——, case of congenital heart disease, Child. 39
—— —— of hæmophilia, Child. 37
——, discussion on case for diagnosis, Child. 12, 49
—— —— —— of enlarged liver and spleen, Child. 34
—— —— —— of perithelioma of orbit, Child. 51
—— —— on coagulation of blood in purpura and hæmophilia, Child. 43
—— —— on congenital obliteration of bile ducts, Child. 27
—— —— on hæmophilia with effusion into knee-joints, Child. 32
—— —— on treatment of three cases of melæna neonatorum, Child. 8
——, enlarged suprarenals and sudden death in an infant, Child. 35
Pritchard, Urban.—Discussion on case of cholesteatoma exposing lateral sinus, Otol. 11
——, discussion on gastro-intestinal sepsis as cause of Ménière's symptoms, Otol. 19, 22
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 36
Prisoners of war, weekly allowance of diet to (1797), Epid. 81
Procopius on St. Cosmas and St. Damian, quoted, Hist. 72
Proptosis of left eye, case (E. D. D. Davis), Laryng. 138
Protein, biological value must be increased with its reduction in diet, Epid. 57
——, calorie value of, Epid. 62

Protein, daily amount consumed by various groups of industrial workers compared, Epid. 70
—— in diet, amount in proportion to carbohydrates, Epid. 40, 41, 60
—— —— ——, minimum daily requirement, Epid. 41, 55-60
——, metabolism of, in body, Epid. 57
——, minimum, in diet, Epid. 71, 72
—— ——, possible in diet, Epid. 64
—— not stored in body, Epid. 58
—— ration in British Army, Epid. 41, 54, 55
—— —— in European Armies, Epid. 41, 54
—— —— in Italian army, Epid. 41, 54, 55
—— —— —— ——, reduction, Epid. 41, 54, 55
—— ——, reduction of, Epid. 41, 55
——, substitution for carbohydrate in diet, Epid. 63
——, under what conditions carbohydrate better source of energy than, Epid. 63
—— value of milk, meat, and potatoes, Epid. 57
Proteins of body, re-creation of, Epid. 57
Prothrombin, Child. 43
—— and antithrombin, balance between, factor in coagulation of blood, Child. 43
Protozoa and other organisms, enumeration, new counting chamber for (J. W. Cropper), M.B.L. 1-12
——, ciliate, enumeration, M.B.L. 2
——, enumeration, avoidance of error in, M.B.L. 4
—— —— by counting-chamber method, M.B.L. 8-11
—— —— by drop-measuring method, M.B.L. 4
—— —— by graduated pipette method, M.B.L. 5
—— —— by hæmocytometer, M.B.L. 2, 3
—— —— by ruled slide and wax-ring method, M.B.L. 6
—— ——, difficulties, M.B.L. 2
—— —— in suspension of organism in emulsion, M.B.L. 3
—— (soil) enumeration, M.B.L. 3
Prurigo diathésique de Besnier, case (George Pernet), Derm. 67
Pruritus in Hodgkin's disease (lymphogranulomatosis prurigiuosa) (F. Parkes Weber and P. W. Dove), Derm. 68
Psoriasis, case of (S. E. Dore), Derm. 49
——, treatment by intramuscular injections of sulphur, eucalyptol and oil of sesame, Derm. 49, 50
Psychiatry, clinical, relation of psycho-analysis to, Psych. 22
Psycho-analysis, class of war-neuroses suitable for treatment by, Psych. 36
——, investigation of war-neuroses by, Psych. 23
——, training in, essential, Psych. 36
Psychological aspect of food shortage, Epid. 83, 84
—— —— of speech function, Neur. 2
—— treatment of functional nervous disorders in soldiers, Neur. 46
Psychoneurasthenics, rest important for, Neur. 47
Psycho-neurotic symptoms, object of construction, Psych. 33
Publicans, effect of alcoholism on, in mortality from various diseases, Epid. 135, 136
——, mortality from tuberculosis at various age periods, Epid. 136, 137
—— —— —— ——, compared with that for other diseases, Epid. 135, 136
Pug nose type of nasal deformity, treatment, Laryng. 88, 107
Puerperal eclampsia during "twilight sleep," Obst. 31, 32
Puerperium after "twilight sleep" in childbirth, Obst. 14
——, recovery from, after "twilight sleep," Obst. 14
Pulse, maternal, effect of scopolamine-morphine in childbirth on, Obst. 11, 19
Pulse, radial, in case of mitral stenosis with fibrillation of auricle, curves showing, Therap. 30, 31

Pulse-rate, effect of tincture of digitalis on, day before onset of fibrillation of auricle in case of mitral stenosis, curve showing, Therap. 3, 4

—— —— —— —— after onset of fibrillation of auricle in case of mitral stenosis, curve showing, Therap. 13

—— in case of mitral stenosis, effect of strophanthus tincture on, after onset of fibrillation of auricle, Therap. 27

—— —— —— —— —— —— —— ——, during fibrillation of auricle, curve showing, Therap. 20. 25

—— —— —— —— with fibrillation of auricle, effect of strophanthus tincture on, curves showing, Therap. 29

—— —— —— —— —— —— ——, effect of various drugs of digitalis group, curves showing, Therap. 49, 51

—— —— —— —— —— —— —— —— of strophanthus on. tracings showing, Therap. 16, 18, 26

—— —— —— —— —— —— ——, immediate effect of massive dose of digitalis on, tracing showing, Therap. 37

Pulses, radial and jugular, in case of mitral stenosis with fibrillation of auricle, effect of apocynamarin on, tracings showing, Therap. 15

—— —— —— —— —— —— —— —— ——, effect of apocynum tincture on, tracings showing, Therap. 21, 22

—— —— —— —— —— —— —— —— ——, tracings taken before and after massive single dose of digitalis tincture, Therap. 32-36

—— —— —— —— —— —— —— —— —— —— at various intervals after discontinuance of tincture of digitalis and diuretin, Therap. 39

—— —— —— —— —— —— —— —— —— —— taken eight days after apocynum tincture was stopped, Therap. 24

—— —— ——, tracing taken two days after course of digitalis tincture was stopped in case of mitral stenosis with fibrillation of auricle, Therap. 11

—— —— ——, tracings of, after onset of fibrillation of auricle in case of mitral stenosis, Therap. 5, 6

Pupils, temporary inequality in lesions of sensory cortex, Neur. 23

Purpura and hæmophilia, coagulation of blood in (W. Palmer Lucas), Child. 42

——, hæmorrhagic, diathetic, or multiple hæmorrhagic telangiectasis? (case for diagnosis), (W. K. Sibley), Derm. 70-73

—— in newly-born, Child. 43, 44

——, treatment by blood-transfusion, Child. 43

Putrid sore throat accompanying famine in England (1315-16), Epid. 73

Pyæmia, aural, and bacteræmia, diagnosis between, Otol. 50

—— ——, minor forms of, Otol. 52

—— —— —— ——, treatment, Otol. 52

Quarantine measures in cholera epidemic in Italian Army (1915), Epid. 45-48

—— —— —— —— —— —— ——, enforced on civil population adjoining war zone, Epid. 48

Quarriers, weavers, and light metal workers, average energy intakes compared, Epid. 67

——, see also *Slate* quarriers, *Sandstone* quarriers

Queen Charlotte's Hospital, report on sixty-seven cases of "twilight sleep" in childbirth at, Obst. 34

Queen Mary's Auxiliary Hospital, special objects of work at, R.S.M. Lect. 9

Queen's Hospital, Frognal, Sidcup, demonstration of cases at, Odont. 4

Quinine, administration in prophylaxis against malaria in Italian Army, Epid. 52

—— ——, nature of vertigo diagnosed by, Otol. 23

—— in relief of aural vertigo, Otol. 23

—— prophylaxis against malaria, Epid. 18

—— —— —— ——, failure in Macedonia, Epid. 18

Rabbits, eyes of, experimental injection with tubercle bacillus causing infection of ciliary body, Ophth. 1
——, gall-bladders of, introduction of gall-stones containing radium into, in experimental production of carcinoma, results, Path. 7-14
Racquet incision in amputation through arm, R.S.M. Lect. 22
Radiographers, skilled, a necessity in Jaw Injuries Department, Odont. 3, 7
Radiology and electro-therapeutics, education in, Cambridge scheme for, Electr. 6
—— —— ——, London scheme for, Electr. 5
—— —— ——, necessity for (G. Harrison Orton), Electr. 1
Radium, amount contained in human carcinomatous tissues, Path. 1
—— —— inserted into gall-stones introduced into gall-bladder of rats to produce carcinoma, Path. 3
—— contained in gall-stones from primary carcinoma of gall-bladder, Path. 1
——, estimation by alpha-ray and gamma-ray electroscope, Path. 2
——, experimental production of carcinoma by means of, attempt (W. S. Lazarus-Barlow), Path. 1
—— —— —— —— ——, results discussed, Path. 15
—— in treatment of multiple papillomata of larynx, Laryng. 67
—— —— of rodent ulcer, case (E. G. Graham Little), Derm. 63
—— —— of sarcoma of antrum, Laryng. 36, 37
—— —— of scar tissue of gunshot wounds of larynx, Laryng. 189, 190
—— —— —— —— of operation wounds, Laryng. 189, 190
—— —— —— —— of war wounds and amputation stumps, Electr. 54
—— —— of suppurating wounds at bedside, Electr. 54
——, inoculation into mice to induce production of carcinoma, Path. 2
Ramón y Cajal, covering of intracellular bridges of epithelial cells, quoted, Odont. 59
RANSOM, F.—Muscle contracture following injury, R.S.M. Discussion 10
Rashes, percentage following injection of tetanus antitoxin, Med. 2
Rats and man, plague in, relation between, Epid. 110
——, black, preponderance over brown in Bombay, Epid. 33, 94, 97
—— —— and brown, and man, values of β_1 and β_2 and date of mean of epidemic for, in plague epidemic, Bombay (1908-11), Epid. 97
—— —— —— —— —— ——, values of β_1 and β_2 for district epidemics of plague in Bombay, Epid. 95-97, 112
—— —— ——, correlations between number of deaths from plague in man, and number of deaths among black and brown rats in fortnight preceding, Bombay (1907-11), Epid. 111
——, brown, greater incidence of plague among, in Bombay, Epid. 94, 97
—— ——, host of plague flea (*Ceratophyllus fasciatus*), Epid. 129
——, gall-bladders of, gall-stones introduced into, containing radium, to produce carcinoma, Path. 3
——, immunity to plague after cessation of epizoötic, evidence for, Epid. 98
—— of Bombay, types of, Epid. 93, 94
—— plague epizoötic among, Epid. 93
—— —— —— ——, cessation of, theories discussed, Epid. 98, 99
—— —— —— ——, in Bombay, mortality, Epid. 94
—— —— —— —— ——, seasonal incidence, Epid. 94
—— —— —— in Sydney (1903-07), course of, Epid. 103, 104
——, skin of, introduction of radium beneath, to produce carcinoma, results, Path. 3-7, 16
Rationing, see under *Army*, *Armies*, *Albumen* ration, *Food* rationing, *Protein*
RAWLING, L. B.—Discussion on treatment of injury to peripheral nerves, Electr. 34
Rectal administration of oil-ether (Gwathmey's method) in plastic face surgery, Anaesth. 9, 11, 12
Rectum, gunshot injuries of, disruptive phenomena, Path. 99, 100
Re-education in connexion with cessation of repression, Psych. 14
—— of muscles with injured nerve supply, Electr. 31

Re-education of soldiers after recovery from functional nervous disorders, Neur. 48
Reflex excitability, increased, diagnostic of local tetanus, R.S.M. Discussion 13
—— system underlying postural tonus, situation of controlling centres, Neur. 31
—— tonus, definition, Neur. 31
—— ——, muscles to which distributed, Neur. 31
Registrar-General, reports of, occupations arranged in descending order of incidence of pulmonary tuberculosis, Epid. 145, 148
Regression, battle dreams in relation to, Psych. 18
——, definition of term, Psych. 18, 20
Relapsing fever, accompanying pandemic of typhus fever in Serbia (1914-15), Epid. 33
—— —— among British troops in Egypt, Epid. 21
—— ——, prophylaxis by lice destruction, Epid. 21, 22
Renal deficiency in osteomalacia and infantilism, case (H. C. Cameron), Child. 23
Repression and suppression, distinction between, Psych. 2, 19
——, cessation of, faith and suggestion in connexion with, Psych. 14, 15, 19, 20
—— —— in connexion with re-education, Psych. 14
—— ——, therapeutic value, Psych. 4-14, 16
——, definition of term, Psych. 1, 19, 20
——, Freud's views on, Psych. 18, 19
—— of painful war-experiences, Psych. 3; see also under *War experiences*, painful
—— of thoughts of military duties, ill-effects, Psych. 11, 12
——, training of soldiers in, Psych. 2
—— —— ——, result when inadequate, Psych. 2
Respiration, deep and quiet, state of vocal cords during, Laryng. 144-146
——, failure of, after breathing, in child born during "twilight sleep," Obst. 25
—— ——, under chloroform anæsthesia, Anæsth. 27
——, maternal, effect of scopolamine-morphine in childbirth on, Obst. 11, 19
——, nasal, forced, effect on nasal obstruction, Otol. 38, 45
——, normal, absence in children born under "twilight sleep," Obst. 23, 24, 31, 37
—— —— —— —— —— —— —— ——, how started, Obst. 23, 24, 31, 43
Respiratory centre, action of scopolamine on, Obst. 2
—— organs, effect of tri-nitro-toluene on, Epid. 155
Rest important for psycho-neurasthenics, Neur. 47
Restlessness common during stage of induction of "twilight sleep" in childbirth, Obst. 11, 19, 30, 36
Retention cyst of floor of nose (Irwin Moore), Laryng. 59
Retina, arteries of, blockage, causing temporary blindness, Ophth. 5, 6
——, detachment, in cases of changes in the vitreous resulting from penetrating septic wounds, Ophth. 2
Retro-pharyngeal gland, excision of, for recurring retro-pharyngeal abscess of tubercular origin (Norman Patterson), Laryng. 35
Rheumatism, association with granuloma annulare, Derm. 32
—— benefited by Cheltenham waters, Baln. 3, 6
Rhinitis, atrophic, advancement of turbinals not followed by, Laryng. 108, 109
—— ——, treatment by skin grafting in nose, suggested, Laryng. 109
——, chronic, effect on palate, Otol. 26, 31
——, hypertrophic, accompanying gastro-intestinal sepsis, Otol. 16
Rhinoplasty, advancement of turbinals in, Laryng. 89
——, case of (J. L. Aymard), Laryng. 98
——, demonstration on (H. Delf Gillies), Laryng. 87
——, difficulties in, Laryng. 87, 102
——, implantation of cartilage in, Laryng. 102
——, subtotal, case of, Laryng. 89
——, voice-production in connexion with, Laryng. 109
Rhinotomy, lateral, in epithelioma of ethmoidal labyrinth, removal (Dan McKenzie), Laryng. 31

Rho, General, question of reform in rationing of Italian navy and army first raised by, Epid. 42

Rib, broken, in gunshot injury, simple displacement of fragments causing injury to lung, Path. 88

—— cartilage, transplantation, to fill in depressed scar following mastoid operation, Otol. 56

—— or clavicle, fragments of, driven into lung with missile, Path. 88

—— transplantation operation, embedding cartilage under skin at time of, Laryng. 88

Ribs, overlying, fracture of, causing increased damage in bullet wound of liver, Path. 62

Rickets, ætiology unknown, Path. 43

——, delayed, relation of cases of infantilism and osteomalacia to, Child. 24

——, diagnosis from osteomalacia sclerotica, Path. 43

——, fœtal, see *Osteogenesis imperfecta*

——, rarity in the Sudan, Path. 43

Riddoch, George.—Muscular hypotonia and changes in nutrition, associated with lesions of the posterior columns of the spinal cord and of the posterior roots, Neur. 31

Rifle bullet and shrapnel bullet, velocity compared, Path. 49

—— ——, gross damage inflicted by, factors modifying, Path. 49

—— ——, wound from, causing arteriovenous communication, Path. 76

——, cleaning of, gaping wound of leg received during, Path. 50

—— wounds in Italian army at front, Epid. 43

—— —— in Russo-Japanese War, Epid. 43

Ringworm, case of (case for diagnosis: S. E. Dore), Derm. 65

——, discovery obscured by treatment, Derm. 65

—— of scalp in adult treated with X-rays, followed by lupus erythematosus, case (E. G. Graham Little), Derm. 4

——, small-spored, case (S. E. Dore), Derm. 6

Rivers, W. H. R., F.R.S.—Repression of war experience, Psych. 1

——, sense of shame in soldiers from increasing sense of fear, quoted, Psych. 31

Rodent ulcer, diagnosis, Derm. 45

—— ——, treatment by application of arsenical paste, Derm. 45, 63, 64

—— —— —— by radium, case (E. G. Graham Little), Derm. 63

—— ulcers, multiple, with X-ray burns (E. G. Graham Little), Derm. 43

Roehampton, see *Queen Mary's* Auxiliary Hospital

Rolleston, J. D.—Discussion on "botulism," Child. 52, 53

——, discussion on serum sickness, Med. 2

Rolleston, Sir Humphry, K.C.B.—Serum disease after intrathecal injections of serum (abstract), Med. 1

Rollier, constitutional effects of insulation, Electr. 11

Rorke, Miss Margaret.—Discussion on scopolamine-morphine narcosis in childbirth, Obst. 40

Rose, F. A.—Discussion on case of nasal fibroma (of right fossa), Laryng. 10

——, discussion on pedunculated carcinoma of pharynx, Laryng. 124

—— —— on surgical *contretemps* (accident in intratracheal administration of ether), Laryng. 74

—— —— on symmetrical ulceration of vocal cords, Laryng. 118

—— —— on treatment by diathermy of extensive epithelioma, Laryng. 24

——, foreign body impacted in the trachea (part of the shell of a Brazil nut), Laryng. 129

——, sarcoma of the antrum, Laryng. 36

Ross, Sir Ronald, F.R.S., mathematical theory of epidemics, Epid. 115-127

Roth, Paul Bernard.—Case of hæmophilia with effusion into knee-joints, Child. 29, 40

——, case of osteogenesis imperfecta (fragilitas ossium, fœtal rickets), Child. 42

Roumania, typhus fever epidemic in, 1916, Epid. 39

Routh, Amand.—Discussion on scopolamine morphine narcosis in childbirth, Obst. 43

Roxburgh, A. B.—Implantation cyst in a girl, aged 14, Ophth. 10

Rubner, theory of specific energy of foodstuffs, Epid. 62

——, value for fat in diet, Epid. 62

Ruled slide and wax-ring method in enumeration of protozoa, M.B.L. 6
Russian Jews, artificial production of folliculitis in, to avoid military service, Derm. 83, 84
Russo-Japanese war, artillery wounds in, Epid. 43
—— ——, rifle wounds in, Epid. 43
Rutherford, John, pupil of Boerhaave, Hist. 15

Saccharomyces mycoderma, penetration of dentine by, Odont. 99
St. Thomas's Hospital, report on eighty cases of "twilight sleep" at, Obst. 15-29
Sajodin in accladiosis, Derm. 17, 18
Salivary calculus, see *Calculus*, salivary
—— glands, fluid from, discharged through parotid fistula, Otol. 55, 56
Salonica, prevalence of dysentery in, Epid. 3
—— —— of enterica in (1916), Epid. 10
——, trench fever in, Epid. 19, 20
Sandfly fever at Cape Helles, Epid. 22
—— —— in Gallipoli Peninsula, Epid. 22
—— ——, occurrence of, in Eastern campaigns, Epid. 22
—— —— prophylaxis against, Epid. 23
——, suspected carrier of leishmania, Epid. 25
Sandstone quarriers and slate quarriers, age incidence of deaths from pulmonary tuberculosis among, in North Wales compared, Epid. 147, 148
Saphenous nerve, internal, causing pain about level of posterior margin of tibia in amputations below knee, R.S.M. Lect. 17
—— —— ——, difficult to identify after amputation, R.S.M. Lect. 17
—— —— ——, femoral artery and vein, excision of distal segments in relief of painful stump in amputation of thigh, R.S.M. Lect. 19
—— —— ——, involvement in scar tissue cause of pain in amputation stumps, R.S.M. Lect. 17
Sarcoma and epithelioma of antrum, malignancy compared, Laryng. 34
——, multiple, idiopathic, hæmorrhagic of Kaposi (miscalled), case for diagnosis (J. J. Pringle), Derm. 107
—— of antrum (F. A. Rose), Laryng. 36
—— of pharynx, treatment by diathermy, Electr. 47
—— of lung, primary, with specimens (J. Porter Parkinson), Child. 19
——, round-celled, malignancy extreme, Laryng. 37
—— (so-called multiple idiopathic pigment) of Kaposi, case (J. H. Sequeira), Derm. 20
Saws, circular, driven by electric motor, bone-graft cut from tibia by, Odont. 45
Sayer, Miss E.—Discussion on electrical treatment of war wounds and scar tissue, Electr. 55
Scalp, ringworm of, in adult treated with X-rays followed by lupus erythematosus (E. G. Graham Little), Derm. 4
Scar, depressed, following mastoid operation (H. J. Banks-Davis), Otol. 56
—— —— —— —— ——, treatment suggested, Otol. 56
—— tissue of operation wounds, radium treatment, Laryng. 189, 190
—— —— of war wounds and amputation stumps, irritant nature of (E. M. Corner), Electr. 49-53
—— —— —— —— —— ——, treatment by X-rays and radium, Electr. 54
—— —— —— —— —— —— ——, electrical, Electr. 54, 55
Scarlet fever, followed by concentric narrowing of each meatus at age of 5 (H. Tilley), Otol. 65
Schimmelbusch's mask, in administration of ether in home military hospitals, Anæsth. 5
Schmiedeberg, transport of chloroform from lungs by red corpuscles, quoted, Anæsth. 22
Sciatic nerve, foot-drop due to injury of, by gunshot wound, Derm. 48
—— ——, principal cause of principal nerve troubles after amputation of thigh, R.S.M. Lect. 20

Sciatic notch, inflammatory focus about, in local non-suppurative infection following acute mastoid invasion, Otol. 52
Sclerodactyly, case (J. H. Sequeira), Derm. 19
Sclerodermia, guttate type of, Derm, 27, 28
Sclerosis, insular, tremors of vocal cords in, Laryng. 147
Scopolamine, action, Obst. 2
—— —— on nervous system, Obst. 3
—— —— on respiratory centre, Obst. 2
—— —— resemblances to and differences from that of atropine, Obst. 2
—— ——, sensory impulses received under, Obst. 3
——, administration, form of, Obst. 1
——, chemistry, Obst. 1
——, effect on unstriped muscle of urinary tract, Obst. 2, 3
——, over-dosage or idiosyncrasy towards, indications, Obst. 2
—— hydrobromide, decomposition, how prevented, Obst. 2
Scopolamine-morphine narcosis in childbirth, administration, time for beginning, Obst. 27
—— —— ——, dosage, Obst. 4, 6, 27, 34, 36, 39, 41, 42
—— —— —— ——, guides to, Obst. 7, 8, 17
—— —— —— —— ——, memory test, Obst. 7, 8, 17, 30, 34, 42
—— —— —— ("twilight sleep"), absence of normal respiration in child on delivery, Obst. 23, 24
—— —— —— —— ——, administration of general anæsthetic during, Obst. 26, 31-33, 39, 41
—— —— —— —— ——, amnesia in, Obst. 7, 8, 12, 18, 27, 28, 30, 40
—— —— —— —— ——, analgesia during, Obst. 11, 18, 27, 30, 42
—— —— —— —— ——, avoidance in uterine inertia, Obst. 9, 31, 44
—— —— —— —— ——, cases analysed, Obst. 16
—— —— —— —— —— ——, selected, Obst. 16
—— —— —— —— ——, children born during, in state of oligopnœa, Obst. 13
—— —— —— —— ——, condition of child at birth, Obst. 12, 22, 31, 35
—— —— —— —— —— —— of patient after delivery under, Obst. 22
—— —— —— —— ——, diminution of labour-pains under, Obst. 3
—— —— —— —— ——, disadvantages, Obst. 29, 43, 44
—— —— —— —— ——, effects in cases of heart disease, Obst. 27
—— —— —— —— —— —— of administration of general anæsthetic at end of second stage, Obst. 28
—— —— —— —— —— —— on fœtal heart before delivery, Obst. 12
—— —— —— —— —— —— on labour-pains, Obst. 3, 36
—— —— —— —— —— —— on maternal pulse and respiration, Obst. 11, 19, 30
—— —— —— —— —— —— on second stage of labour, Obst. 31
—— —— —— —— ——, effects on third stage of labour, Obst. 10
—— —— —— —— —— —— on uterine contractions, Obst. 9, 20
—— —— —— —— ——, expulsion of placenta during, Obst. 21, 31
—— —— —— —— ——, first introduction into obstetric practice, Obst. 3
—— —— —— —— ——, followed by post-partum hæmorrhage, Obst. 21, 22
—— —— —— —— ——, forceps deliveries under, Obst. 34, 37
—— —— —— —— ——, hæmorrhage during third stage of labour under, Obst. 35, 39
—— —— —— —— ——, hypalgesia during, Obst. 42
—— —— —— —— ——, injection of pituitrin into patients under, Obst. 10, 25, 26
—— —— —— —— ——, instrumental delivery under, analysis of ten cases, Obst. 26
—— —— —— —— ——, islands of memory in, Obst. 4, 8, 10
—— —— —— —— ——, labour during, character of, Obst. 20, 21, 37, 38
—— —— —— —— ——, loss of apperception under, Obst. 3
—— —— —— —— ——, medical attendance during, Obst. 34, 40
—— —— —— —— ——, mental confusion during, Obst. 20, 30, 36
—— —— —— —— ——, must be limited to selected cases, Obst. 44

Scopolamine-morphine narcosis in childbirth ("twilight sleep"), natural sleep during, Obst. 11, 19
—— —— —— —— ——, nursing under, Obst. 29, 38, 40
—— —— —— —— ——, observations to be recorded at each injection, Obst. 4, 5
—— —— —— —— ——, occipito-posterior labours in, percentage not undergoing rotation, Obst. 37, 38
—— —— —— —— ——, puerperal eclampsia during, Obst. 31, 32
—— —— —— —— ——, report of committee to investigate effects of, Obst. 1
—— —— —— —— —— —— on cases at General Lying-in Hospital, Obst. 29
—— —— —— —— —— —— —— at Queen Charlotte's Hospital, Obst. 34
—— —— —— —— —— —— —— at St. Bartholomew's Hospital, Obst. 6
—— —— —— —— —— —— —— at St. Thomas's Hospital, Obst. 15
—— —— —— —— ——, results, Obst. 28, 31, 34
—— —— —— —— ——, sensory impulses under precautions for exclusion, Obst. 6, 15
—— —— —— —— ——, stillbirths following delivery under, Obst. 23, 25, 26
—— —— —— —— ——, thirst during, Obst. 20, 31, 34
—— —— —— —— ——, white asphyxia of children born under, Obst. 13, 24-26
Scorbutus, case of, advice of Boerhaave in, Hist. 7
SCOTT, SYDNEY.—Discussion on case of cholesteatoma, exposing lateral sinus, Otol. 11
——, discussion on case of complete deafness and loss of labyrinth function, Otol. 13
—— —— on gastro-intestinal sepsis as cause of Ménière's symptoms, Otol. 21
—— —— on war injury of ear, Otol. 8
Screen examination and bronchoscopy combined, Tilley's method, Laryng. 53
Screw filling, ultimate solution of clean working in T.N.T. factories, Epid. 154
Screw-lever splint (H. P. Pickerill), Odont. 90
Screw mouth openers, use of, Odont. 13
Screws, silver-plated, and silver plates, fixation of bone-graft by, in ununited fractures of mandible, Odont. 44
——, vertical, shell-filling with T.N.T. by, Epid. 154
Scurvy, antiscorbutic diet in, Epid. 28
—— at Millbank Penitentiary, Epid. 77, 78
—— in Mesopotamia, among Indian troops, on Tigris front, Epid. 27
——, prevention of, Epid. 54
Seamen and mariners, weekly ration of (1823), Epid. 81
Sebaceous glands, microscopical examination in case of keratosis follicularis, Derm. 36, 37
Serbia, see *Army* (Serbian) typhus fever
Serbian population deported by sea, stamping out pestilence among, Epid. 49, 50
Sedentary workers, calorie value of diet of, Epid. 55, 57
—— ——, food requirements of, effect of exposure to cold and wind on, Epid. 71
—— ——, protection from cold, in relation to food economy, Epid. 71
Self-love, distinction from sexual impulses directed outwards, Psych. 35
——, wounded, characteristics of, Psych. 35, 36
Semi-starvation lowers bodily resistance to all infections, Epid. 82, 83
Semon, Sir Felix, state of vocal cords during quiet respiration, quoted, Laryng. 144, 146
——, width of glottis, quoted, Laryng. 143, 144
Sensation, effect of injury to posterior spinal roots, with muscular hypotonia on, Neur. 33, 34
Sensory affections in lesions of sensory cortex, Neur. 23
—— impulses perceived under action of nervous system, Obst. 3
—— —— under "twilight sleep," precautions for exclusion, Obst. 15
Sepsis, administration of anæsthetics in cases of, Anæsth. 6, 7
—— complicating bone-grafting in ununited fracture of mandible, Odont. 44, 45
——, conditions, found post mortem in soldiers, coinciding with appearances of degeneration of heart-muscle, Anæsth. 2
——, gastro-intestinal, blood-pressure in, Otol. 16
—— ——, cause of Ménière's symptoms (T. Mark Hovell), Otol. 15

Sepsis, gastro-intestinal, dilatation of heart in, Otol. 16
—— ——, symptoms, Otol. 16
—— ——, treatment, Otol. 17
——, morphia contra-indicated in cases of, Anæsth. 6
——, oral, prevention, in fractures of mandible, Odont. 28, 29
Septal swings and turbinal shifts in gunshot wounds of nose, cases (G. S. Hett), Laryng. 99
Septic wounds, penetrating, changes in vitreous resulting from (R. H. Elliot), Ophth. 1
Septicæmia, aural, and bacteræmia, diagnosis between, Otol. 51
—— —— treatment by injection of collosol argentum, Otol, 49
—— —— —— by urotropine and vaccines, caution necessary in, Otol. 50, 51
—— in T.N.T. workers, wrongly ascribed to T.N.T. poisoning, Epid. 157
Septum, nasal, cartilage, vascular system, Laryng. 98
—— ——, congenital appendages (teratoid tumours) of, in two children (A. Brown Kelly), Laryng. 125
—— —— deflection of, causing deafness, Otol. 34
—— ——, new cartilaginous, formation of, Laryng. 101
—— ——, operation on, method of anæsthetization discussed, Laryng. 74
—— ——, perforation of, double, with peculiar appearance of soft palate, case (H. J. Banks-Davis), Laryng. 167
—— ——, resection, submucous, accident during intratracheal administration of ether for, Laryng. 73, 74
—— —— ——, resulting in saddle-back nose, in male, aged 22 (Sir StClair Thomson), Laryng. 20
—— ——, spurs of, removal, in cases of deafness, Otol. 37
—— —— —— —— in nasal obstruction, Otol. 37, 38, 41, 43, 45
—— —— —— —— in otosclerosis, Otol. 37, 38, 43
—— ——, support of, employment of autogenous costal cartilage graft for, in case of sunken-in nose (G. S. Hett), Laryng. 96
—— ——, transplantation of cartilage into (J. F. O'Malley), Laryng. 139
Sequestra, painless extrusion under heliotherapy, Electr. 11
SEQUEIRA, G. W.—Case of guttate morphœa, striæ et maculæ atrophicæ, Derm. 94
——, three cases of fibroma molluscum, Derm. 82
SEQUEIRA, J. H.—Case of sclerodactyly, Derm. 19
——, case of so-called multiple idiopathic pigment sarcoma of Kaposi, Derm. 20
——, discussion on primary syphilitic chancre of umbilicus, Derm. 24
——, four cases of dermatitis due to high explosives used in the recent air raids, Derm. 12
Serum, anti-tetanic, importance of early administration, R.S.M. Discussion, 9, 11, 12
—— ——, injection in prophylaxis of tetanus, R.S.M. Discussion, 21
—— —— —— —— ——, dosage, R.S.M. Discussion, 22
—— —— —— —— ——, in trench foot cases, R.S.M. Discussion, 21
—— —— —— in treatment of tetanus by intrathecal or intramuscular route, R.S.M. Discussion, 23, 24
—— —— injections, intramuscular, in local tetanus, R.S.M. Discussion, 14
——, anti-streptococcic, dosage, Otol. 50
—— ——, inoculation in aural bacteræmia, Otol. 52
—— disease after intrathecal injections of serum (Sir H. D. Rolleston), Med. 1
—— —— in cerebrospinal meningitis (C. B. Ker), Med. 1
—— ——, symptoms, in relation to dose of diphtheria antitoxin, Med. 2
—— —— —— in relation to severity of attack of diphtheria, Med. 2
——, injection of, in cases of melæna neonatorum, Child. 7, 8
Sesame, oil of, eucalyptol and sulphur, intramuscular injections in psoriasis, Derm. 49, 50
Sexual desires, repressed, finding expression in neurosis, Psych. 29
—— goal, deflection to non-sexual, Psych. 26
—— hunger, defensive, reaction of ego against, Psych. 35
—— —— in relation to developed dread in real danger, Psych. 35

Sexual hunger, narcissistic, Psych. 35
—— impulses directed outwards, distinction from self-love, Psych. 35
—— instinct, conflict with ego ideal, Psych. 32, 33
—— ——, repressed, morbid anxiety in relation to, Psych 33, 34
Shakespeare, medical son-in-law of, John Hall (R. W. Leftwich), Hist. 77
SHATTOCK, S. G., F.R.S.—Discussion on experimental production of carcinoma by means of radium, Path. 17
——, discussion on fusiform dilatation of œsophagus, Laryng. 30, 31
—— —— on lupoid tuberculosis of pharynx, Laryng. 45
—— —— on sarcoma of antrum, Laryng. 36
——, disruptive phenomena in gunshot injuries, Path. 47-118
——, report on specimen from case of nasal fibroma (of right fossa), Laryng. 11
Sheep scab, epidemics in Ireland (1900-1905), Epid. 125, 126
Shell-filling factory, diminution of tri-nitro-toluene poisoning in, Epid. 152
—— —— with tri-nitro-toluene by hand, skilled and unskilled workers at, Epid. 153, 154
—— —— —— ——, improved methods, Epid. 151
Shell fire, escape from, moral reprobation attaching to, in war, Psych. 29
—— fragment, small, causing extensive comminuted fracture of femur, Path. 50
—— —— wound of liver causing complete division of organ, Path. 59
—— —— wounds of liver causing fissured perforations, Path. 52-54, 57
—— —— —— of small intestine, Path. 97, 98
—— fragments, causing tunnelled wounds of liver, Path. 63-67
—— —— embedded in lung, Path. 88
—— shock, galvanometer deflexions in, Electr. 25, 27
—— ——, laryngeal neuroses due to, Laryng. 182
—— ——, stammering from, Laryng. 196, 197
—— ——, term replaced by that of war-shock, Psych. 24
—— wound of spinal cord, Path. 77
SHERRINGTON, C. S., F.R.S.—Definition of reflex tonus, quoted, Neur. 31
——, muscle contracture following injury, R.S.M. Discussion 18
Shetland Islands and London, age incidence of deaths from pulmonary tuberculosis in males compared, Epid. 147
Shiga's bacillus as cause of dysentery, Epid. 5
SHIPWAY, F. E.—Discussion on administration of anæsthetics in home military hospitals, Anæsth. 12
Shock, chronic, administration of anæsthetics in cases of, Anæsth. 6
—— —— administration of morphia valuable in cases of, Anæsth. 6
Shoemakers, mortality from tuberculosis in, at various age periods, Epid. 136, 137
—— —— ——, compared with that from other diseases, Epid. 135, 136
——, pulmonary tuberculosis in, mortality rates, ages 35-45 (1900-1902). Epid. 144
Shrapnel bullet and rifle bullet, velocity compared, Path. 49
—— —— causing tunnelled wound of liver, Path. 66
—— —— penetrating lesser omentum, with encystment of bullet, Path. 99
—— embedded in neck (W. Stuart-Low), Laryng. 120
—— wound of left side of face (G. S. Hett), Laryng. 95
—— —— —— —— —— —— operation for, Laryng. 96
—— —— of neck and larynx, case (W. Stuart-Low), Laryng. 179
—— —— —— —— ——, question of leaving shrapnel embedded in tissues, Laryng. 179, 193, 194
—— —— of trachea, case (W. S. Syme), Laryng. 177
SIBLEY, W. KNOWSLEY.—Angiokeratoma, Derm. 101
——, case of bromide eruption, Derm. 32
—— —— of keratosis follicularis (Darier's disease), Derm. 34
—— —— of lupus vulgaris, with cutaneous horns, Derm. 54
——, cases for diagnosis, Derm. 70, 83

Sibley, W. Knowsley.—Discussion on case of granuloma annulare, Derm. 32
——, discussion on case of pre-mycotic erythrodermia, Derm. 98
——, lichen obtusus corneus, Derm. 97
——, mycosis fungoides, Derm. 93
Silence (sanatorium) and galvano-cautery, extensive tuberculosis of larynx completely cicatrized under (Sir StClair Thomson), Laryng. 16
Silica, evil properties of, physical, not chemical, Epid. 146
——, inhalation of, affecting prevalence of tuberculosis, Epid. 135, 146
Silk, J. F. W.—Administration of anæsthetics in home military hospitals, Anæsth. 1
Silk ligature in scar tissue, Electr. 50, 52
—— ligatures, avoidance in war wounds, Electr. 50
—— ——, causing irritation in amputation stumps, R.S.M. Lect. 16, 17
Silver plates and silver-plated screws, fixation of bone-graft by, in ununited fractures of mandible, Odont. 44
Simson, H. J. F.—Discussion on congenital obliteration of bile-ducts, Child. 28
Singer, professional, hoarseness due to scar-tissue of operation wound, radium treatment, Laryng. 189, 190
Singers' nodules, Laryng. 117, 118
—— ——, developing without excessive use of voice, Laryng. 117
Sinuses, advantages of exploration of, by suction syringe in subacute mastoiditis (P. Watson-Williams), Otol. 62
——, healing of, promoted by heliotherapy, Electr. 11
Sinusitis, nasal, latent, as source of otitis media, Otol. 35, 45
—— ——, suppurative, rarely followed by tympanic suppuration, Otol. 30
Sitting position, anæsthesia under, Anæsth. 9, 11, 12
Skiagrams of fractures of mandible, interpretation, Odont. 27
—— of jaw injuries, careful reproduction important, Odont. 3, 7
Skin diseases and laryngology, relations between, awaiting investigation, Laryng. 26
——, dryness of, in "twilight sleep" in childbirth, Obst. 11
—— grafting in nose suggested as means of curing atrophic rhinitis, Laryng. 109
—— —— in rhinoplasty, Laryng. 105
Skin, grenade wounds of, minimal, Path. 79
——, senile malignant degeneration, treatment, Derm. 45
—— (?) tumour of parotids involving (H. G. Adamson), Derm. 73
Skull perforated by extradural abscess (R. Lake), Otol. 59
Slate quarriers and sandstone quarriers, age incidence of deaths from pulmonary tuberculosis among, in North Wales, compared, Epid. 147, 148
Slaters and tilers, pulmonary tuberculosis in, mortality rates, ages 35-45 (1900-1902), Epid. 145
Sleep, natural, during scopolamine-morphine narcosis in childbirth, Obst. 11, 19: see also *Twilight-sleep*
Slides, ruled, for enumeration of fæces, preparation, M.B.L. 8
Slosse and Waxweiler, data as to nutrition of Belgian hand-workers, Epid. 67
—— ——, energy value of food absorbed, quoted, Epid. 62
Small-pox, deaths from, during siege of Paris, Epid. 74, 75
—— epidemic, London (1902), number of persons infected, Epid. 116
——, malignant, mal-development of pustules in, Med. 2
——, occasional prevalence in Eastern campaigns, Epid. 29
——, vaccination against, in Italian army, Epid. 18
Smith, A. Lapthorne.—Discussion on inversion of uterus, Obst. 47
——, discussion on undiagnosed cancer of uterus, complicated by myoma, treated by total hysterectomy, Obst. 5-8
Smith, R. Percy.—Aphasia in relation to mental disease, Neur. 1
Smoking, excessive, in subjects of laryngeal neuroses, Laryng. 193
Smurthwaite, Henry.—Discussion on case of hyper-adduction of left arytænoid cartilage, Laryng. 12

SMURTHWAITE, HENRY.—Discussion on cases of stenosis of the glottis, Laryng. 77
——, discussion on paralysis of arytænoideus, Laryng. 163
—— —— on saddle-back nose consequent on resection of septum, Laryng. 22
—— —— on warfare injuries and neuroses of larynx, Laryng. 182
Snare and forceps, removal of fibro-papilloma of larynx by means of (J. Dundas Grant), Laryng. 64
Snell, S., amblyopia due to di-nitro-benzol, quoted, Epid. 156
Snook apparatus, portable (E. E. Burnside), Electr. 58
Sodium salicylate or aspirin, in minor pyæmias, Otol. 52
Soldiers as subjects of anæsthesia, Anæsth. 2
——, disabled, surface treatments by mineral waters, Baln. 8
——, folliculitis in, from wearing dirty caps, Derm. 52, 53
——, functional aphonia in, Laryng. 182, 183
—— —— ——, paresis of transversus accompanying, Laryng. 165
——, heart muscle of, effect of malaria on, Anæsth. 2
——, mental conflicts in, Psych. 30
——, prolonged suppuration in, Anæsth. 2
——, sense of shame in, from increasing sense of fear, Psych. 31
——, Serbian, clothing of, destruction of lice in, Epid. 34, 35
—— suffering from functional nervous disorders, essentials of treatment (E. G. Fearnsides), Neur. 42
—— —— —— —— ——, light occupations for, during convalescence, Neur. 46, 47
—— —— —— —— ——, on recovery, benefited by games and amusements, Neur. 47
—— —— —— —— —— ——, training in workshops, Neur. 47
—— —— —— —— ——, recovery of, how prevented, Neur. 46
—— —— —— —— ——, unfit for active military duty after discharge from general hospitals, Neur. 44
——, total functional deafness in, recovery from, Otol. 13
——, training in repression, Psych. 2
——, war neuroses in, principal aim of treatment, Psych. 16
——, young, prophylaxis against measles, mumps, whooping-cough and catarrhal diseases in, Epid. 54, 55
Sodium chloride solutions, absorption of chloroform by, Anæsth. 17
SOUBBOTITCH, V.—A pandemic of typhus in Serbia in 1914 and 1915, Epid. 31
Spartein sulphate, effect in case of mitral stenosis, with fibrillation of auricle, Therap. 48
Spas, development of, guiding principles for, Baln. 7, 8
Spasm, clonic (twitching), symptom of local tetanus, R.S.M. Discussion, 12
——, tonic, persistent, symptom of local tetanus, R.S.M. Discussion, 13
Speech centre, motor, localization, Neur. 14
——, defect of, imperception combined with, Neur. 7
——, defects of, rapid cure, Neur. 39
——, disorders of, predominated by accompanying mental disorder, Neur. 4
——, dissolution, starting-point of, Neur. 18
——, function of, disturbance of, must be combined with mental disorder, Neur. 19, 20
—— ——, nature, Neur. 2
——, purpose of, defined, Neur. 6
Speech-utterances, recurring, Neur. 18
SPENCER, HERBERT R.—Removal of an endotheliomatous dermoid of the ovary, and (thirteen and a half years later) a fibro-endothelioma of the vagina, Obst. 59
——, undiagnosed cancer of the body of the uterus complicating myoma, treated by total abdominal hysterectomy, Obst. 48
Sphenoidal sinus, disease of, association of earache with, Otol. 42, 43
—— —— ——, causing thrombosis of cavernous sinus, Otol. 35
—— —— ——, latent, causing otitis media, Otol. 35
SPICER, R. H. SCANES.—Discussion on warfare injuries and neuroses of larynx, Laryng. 197

Spinal cord and posterior roots, close association of sensory and non-sensory afferent paths in, Neur. 32

—— —— cervical enlargement, posterior part, nutritional changes following injuries to, Neur. 36

—— ——, control of increased reflexes and contraction of muscles from different points in R.S.M. Discussion 10

—— ——, posterior columns and posterior roots, lesions of, in association with muscular hypotonia and changes in nutrition (G. Riddoch), Neur. 31

—— —— —— ——, association with tract of cerebellum, Neur. 32

—— —— —— ——, lesion of, how diagnosed, Neur. 36

—— —— —— —— ——, muscular hypotonia following, effect on appreciation of changes in posture, Neur. 34, 35

—— ——, shell wound of, Path. 77

—— ——, termination of, and spinal roots, destruction of, resulting from shell wound, Neur. 28

—— ganglia, trophic functions, how evidenced, Neur. 26

Spine, injuries to, anæsthetics suitable for, Anæsth. 7, 8

—— —— —— —— —— ——, difficulties of administration, Anæsth. 7, 8

Spirit drops, injection, as dressing after mastoid operation, Otol. 74, 75

Spirochætosis, ictero-hæmorrhagic, Epid. 12

Spleen and liver, enlarged, case of, specimens (J. Porter Parkinson), Child. 33

—— and stomach, bullet wound of, results, Path. 91

——, gunshot injuries of, Path. 80

—— —— wound, minimal, Path. 72

——, see also *Liver* and spleen, enlargement

Splint, "screw lever" (H. F. Pickerill), Odont. 90

——, Gunning's modified, method of fixation in fractures of mandible, Odont. 32, 33

Splints, application in fractures of mandible, Odont. 29-31

—— combined with sutures through bone, application in injuries of lower jaw of less severe nature, Odont. 86

—— —— —— —— —— —— for immobilization of extensive fractures of lower jaw (V. H. Kazanjian), Odont. 67

—— for jaw injuries due to war, Odont. 3

—— —— ——, special apparatus needed in individual cases, Odont. 7

—— in fractures of mandible, Odont. 25, 26

—— —— —— and maxilla, Odont. 22

—— —— ——, fixation, methods of, Odont. 32, 33, 47

Sporotrichosis, case of (E. G. Graham Little), Derm. 102

Sport, value of, in deflection of energy of anti-ego impulses, Psych. 26

Spraying and douching, nasal and post-nasal, in relief of deafness, Otol. 41, 45

Squill, tincture of, effect in case of mitral stenosis with fibrillation of auricle, Therap. 48

Stammering from shell shock, prognosis, Laryng. 197

—— —— —— ——, treatment, Laryng. 196, 197

——, rapid cure of, Neur. 39

STARLING, E. H., F.R.S.—Discussion on Italian Medical War Services, Epid. 55

Steam disinfection appliances for destruction of lice, Epid. 35

Steel monochord, bone conduction by, Otol. 5

von Steinbüchel, introduction of "twilight sleep" into obstetric practice by, Obst. 3

Stereognostic sense, impairment of, in lesions of sensory cortex, Neur. 23, 24

Stereoscope attached to roof of mobile X-ray wagon unit, Electr. 57

STEVENSON, A. C., and HARMER, W. DOUGLAS.—Colony of actinomyces in the crypt of a tonsil, Laryng. 161

Stillbirths, number following delivery under "twilight sleep," Obst. 23, 25, 26, 37

STODDART, W. H. B.—Discussion on repression of war experience, Psych. 19

Stomach and spleen, bullet wound of, results, Path. 91

——, contusion, without wounding, from missile, leading to necrosis and perforation, Path. 82

Stomach, distended, gunshot wounds of, exhibiting disruptive phenomena, Path. 91
——, gunshot wound of, minimal, Path. 78
—— —— wounds of, double, perforating, Path. 91, 92
——, hair-ball in (R. Morton), Electr. 15
——, lavage of, in cases of tinnitus, Otol. 20
—— ——, in gastro-intestinal sepsis, Otol. 17
——, machine-gun bullet wounds of, disruptive phenomena, Path. 93, 94
——, œsophagus and colon, abnormal condition of (R. Morton), Electr. 16
Stone-deafness, recovery from, Otol. 13
Stowers, J. H.—Case for diagnosis, Derm. 103
——, discussion on case of adenoma sebaceum, Pringle type, Derm. 25
—— —— —— for diagnosis, Derm. 65
—— —— —— of guttate morphœa, Derm. 95
—— —— —— of ichthyosis hystrix linearis of palms, Derm. 99
—— —— —— of linear lichen planus, Derm. 64
—— —— —— of lupus erythematosus, Derm. 5
—— —— —— —— —— of unusual type, Derm. 76
—— —— —— of lymphangioma tuberosum multiplex, Derm. 30
—— —— —— of miliary syphilide, Derm. 100
—— —— —— of rodent ulcer treated by radium, Derm. 63
—— —— —— of sclerodactyly, Derm. 20
—— —— —— of small-spored ringworm, Derm. 6
—— —— two cases of morphœa guttata, Derm. 27
——, erythema multiforme perstans, Derm. 111
——, photographs of a severe case of congenital ichthyosis, Derm. 7
Straub, experimental injection of eyes of rabbits with tubercle bacillus, producing infection of ciliary body, quoted, Ophth. 1
——, opacities in vitreous due to mild infections, quoted, Ophth. 3
Streptococcal poisoning, treatment by injection of diluted perchloride of mercury, Otol. 52
Streptococcus accompanying suppurative middle ear disease, source, Otol. 49
Strophanthin, intravenous injections of, effect in heart failure of auricular fibrillation, case, Therap. 7, 8
Strophanthus, courses of. effect in case of mitral stenosis with fibrillation of auricle, Therap. 16, 17, 19, 25
——, tincture of, effect in case of mitral stenosis with fibrillation of auricle, Therap. 44
—— —— —— —— —— —— —— —— ——, when administered intravenously, Therap. 46
—— —— —— in massive single dose in case of mitral stenosis with fibrillation of auricle, Therap. 28
Stuart-Low, W.—Case of shrapnel wound of neck and larynx, Laryng. 179
——, discussion on acute mastoiditis, Otol. 55
—— —— on aural bacteræmia, Otol. 50
—— —— on cancer of larynx, Laryng. 128
—— —— on case of chronic suppuration of middle ear and cholesteatoma treated by radical mastoid operation, Otol. 77
—— —— —— of malignant growth removed from right antrum, Laryng. 137
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 40
—— —— on operation on mastoid for acute suppurative inflammation followed by insertion of B.I.P., Otol. 71
—— —— on removal of epithelioma of larynx, Laryng. 152
—— —— on repair of nose by paraffin injection, Laryng. 135, 136
—— —— on thyroid tumour at base of tongue, Laryng. 155
—— —— on warfare injuries and neuroses of larynx, Laryng. 193
——, notes on a case of a tumour of the nasopharynx, Laryng. 119
——, shrapnel embedded in the neck, Laryng. 120
Sturridge, Ernest.—Case of rheumatoid arthritis, treated by ionization of periodontal membrane, Odont. 112

Sublimation, definition of, Psych. 26

Submaxillary gland, removal for suppuration due to calculus, Laryng. 156, 157

—— —— suppuration from (Dan McKenzie), Laryng. 155

Sudan (The), cases of osteomalacia sclerotica occurring in (J. B. Christopherson), Path. 35 4

——, rarity of rickets in, Path. 43

Suez Canal region, prophylactic measures against malaria in, Epid. 17

Suggestion, aids to, in treatment of war neuroses, Neur. 40

—— and faith in connexion with cessation of repression, Psych. 14, 15, 19, 20

Sulphur, eucalyptol and oil of sesame injections in psoriasis, Derm. 49, 50

—— fumigation of sick wards as preventive against lice, Epid. 35

Sunlight, action of, local and remote, Electr. 9, 10; see also *Heliotherapy*

Suppression and repression, distinction between, Psych. 2, 19

Suppuration, prolonged, in soldiers, Anæsth. 2

—— —— ——, effect on heart muscle, Anæsth. 2

Suprarenal extract in relief of Ménière's symptoms, Otol. 19

—— glands, enlarged, and sudden death in infant (E. Pritchard), Child. 35

Supravaginal amputation, superiority of hysterectomy over in myoma of uterus complicated by undiagnosed cancer, Obst. 54

Surgeons of France, see *Confraternity*

Surgery, status of, during later Tudor period, Hist. 55

Suture, primary, early treatment of wounds at the Front with special regard to (Sir A. Bowlby), R.S.M. Lect. 1-4

Sutures, buried, absorbable, in surgery of painful amputation stumps, R.S.M. Lect. 23

—— through bone in combination with splints for immobilization of extensive fractures of lower jaw (V. H. Kazanjian), Odont. 67

Swan, R. H. Jocelyn.—Discussion on treatment of injury to peripheral nerves, Electr. 34

——, muscle contracture following injury, R.S.M. Discussion 4

van Swieten, reformer of medical education in Vienna and pupil of Boerhaave, Hist. 15

——, remedies recommended by, Hist. 9

"Swinging-door" method, division of nerves by, R.S.M. Lect. 11, 12, 23

Sydney, plague epidemic, values of β_1 and β_2 (symmetry and asymmetry and form of curves) for, Epid. 92

—— —— epizootics in rats (1903-07), course of, Epid. 103, 104

Syme, W. S.—Case of shrapnel wound of trachea, Laryng. 177

——, discussion on case of complete paresis of left vocal cord due to mediastinal growth, Laryng. 50

—— —— —— of epithelioma of ethmoidal labyrinth, lateral rhinotomy, Laryng. 33

Syme's amputation, see *Amputation* of foot, supramalleolar

Syphilide, follicular, grouped, small, Derm. 80

——, miliary, case (S. E. Dore), Derm. 100

—— with resemblances to pityriasis rosea (E. G. Graham Little), Derm. 57

Syphilis, acute yellow atrophy of liver in, Epid. 163, 166

—— and tuberculosis, laryngeal, combination of, resulting in stenosis of glottis, requiring tracheotomy, cases (Sir StClair Thomson), Laryng. 76, 77

——, anterior nasal stenosis due to, impairment of hearing rare in, Otol. 28

——, cerebro-spinal, following extensive use of arsenical preparations, Derm. 80

——, congenital, and tuberculosis, association, Child. 13

—— ——, and vitiligo, Child. 18

—— ——, lupoid tuberculosis of pharynx, affecting soft palate and uvula, in boy, aged 8, subject of (Irwin Moore), Laryng. 2, 39

——, diagnosis of accladiosis from, Derm. 16

—— —— of, Wassermann test to exclude, Child. 12, 13

——, epithelioma of left vocal cord in subject of, Laryng. 7, 9

—— in Italian army, prophylactic measures against, Epid. 50

——, tertiary, of pharynx, clinically resembling tuberculosis of lupoid type (Irwin Moore), Laryng. 4, 47

Syphilis, treatment advocated by Victorius, Hist. 57
—— —— by fumigation, early work on, Hist. 58
Syphilitic chancre, primary, of umbilicus (G. Pernet), Derm. 23
—— rash appearing after twenty-three injections of novarsenobillon, case (J. L. Bunch), Derm. 78
Syringe for lateral sinus, Otol. 11
—— (suction), advantageous exploration of sinuses by (P. Watson-Williams), Otol. 62

Tabes dorsalis, tremors of vocal cords in, Laryng. 148
Tactile localization unaffected in muscular hypotonia following lesion of posterior part of spinal cord, Neur. 34, 35
—— sensation, disturbances of, in lesions of sensory cortex, Neur. 23
Tailors, pulmonary tuberculosis in, mortality rates, ages 35-45 (1900-1902), Epid. 144
Takahashi, vacuolation in vessels containing malignant emboli, quoted, Path. 25
Teeth, after-death destruction by mould fungus (F. J. Bennett), Odont. 93-100
—— and alveolus, fractured, treatment, at Jaw Injuries Centre, Odont. 12
——, aspirated into air passages, before introduction of bronchoscopy, proportion of recoveries and fatal cases, Odont. 110
—— —— —— ——, cases reported, Odont. 108, 109
—— —— —— ——, fatal cases, Odont. 110
—— —— —— ——, methods of removal, Odont. 110
—— —— —— ——, proportion of cases reported before and after introduction of bronchoscopy, Odont. 110
—— —— —— ——, spontaneous expulsion, Odont. 110
—— —— —— ——, statistics relating to, Odont. 109, 110
——, cleansing of, in war injuries of jaw, Odont. 25, 26
——, extraction, in jaw injuries, Odont. 13, 15, 16
——, hard tissues of, calcification, Odont. 63
—— —— —— ——, adsorption in relation to, Odont. 63, 64
—— invaded by mould fungus, from Costa Rica, Odont. 96, 97
—— —— —— ——, from Ireland, Odont. 96, 97
——, on one side only posterior to fractures of lower jaw, with extensive comminution of mandible, cases, Odont. 73
—— posterior to fracture of lower jaw on both sides, extensive comminution of mandible, cases, Odont. 69
—— preservation, after fractures of mandible, Odont. 28, 44, 47
Telangiectases, hæmorrhagic, multiple or diathetic hæmorrhagic purpura? (case for diagnosis, W. K. Sibley), Derm. 70-73
Temperature, atmospherical plague in relation to, Epid. 106, 113, 128, 129
Temporo-mandibular joint, ankylosis of, treatment by arthroplasty (H. P. Pickerill), Odont. 87
Temporo-maxillary joint, left, and both hip joints, congenital malformation of (A. S. Blundell Bankart), Child. 16
Tendon jerks, in lesions of sensory cortex, Neur. 24
Teratoid growth or hairy polypus of nasopharynx (A. Brown Kelly), Laryng. 57
—— tumours (congenital appendages) of nasal septum in two children (A. Brown Kelly), Laryng. 125
Testamentary capacity in aphasia, Neur. 4, 6, 17
—— —— ——, cases illustrating, Neur. 14-17
Testicle, gunshot wound of, perforating, Path. 117
Tetanus antitoxin, concentrated, diminution of rashes following injection, Med. 2
—— ——, injection of, percentage of rashes following, Med. 2
—— bacilli, infection from, after lying latent in tissues, R.S.M. Discussion 21
——, chronic or local, case of, R.S.M. Discussion 4

Tetanus following operations on intestine, R.S.M. Discussion 21
——, generalized, prevention, by serum injections, R.S.M. Discussion 9
——, local, becoming generalized, R.S.M. Discussion 12
—— ——, case of, long persistence, recovery, R.S.M. Discussion 12
—— ——, causing muscular contracture, R.S.M. Discussion 10, 11
—— ——, central origin, R.S.M. Discussion 10
—— ——, diagnosis, R.S.M. Discussion 9, 19
—— —— —— from functional disease of nervous system, important, R.S.M. Discussion 18, 20
—— —— ——. points in, R.S.M. Discussion 9, 10
—— ——, experimental production, R.S.M. Discussion 6, 9, 10
—— ——, in cat, R.S.M. Discussion 6, 9
—— ——, in horses, R.S.M. Discussion 18
—— ——, pathological definition easy, clinical more difficult, R.S.M. Discussion 14
—— ——, question whether muscle contracture following injury due to, R.S.M. Discussion 9
—— ——, symptoms diagnostic of, R.S.M. Discussion 12-15
—— ——, treatment by intramuscular injections of antitetanic serum, R.S.M. Discussion 14
—— —— —— by intrathecal injections of anti-tetanic serum, R.S.M. Discussion 23
—— ——, wide incidence, explanation, R.S.M. Discussion, 11
——, prophylaxis against, by injections of anti-tetanic serum, R.S.M. Discussion 19, 22, 23
—— —— —— —— —— ——, percentage of mortality according to number of injections, R.S.M. Discussion 22
—— spores, ingestion of, risk from, R.S.M. Discussion 21
Tetra-nitro-methane, character and effects on T.N.T. workers, Epid. 155
——, in crude T.N.T., Epid. 155
Thigh, amputation of, see *Amputation*
——, path for ascent up, of irritative infective inflammation from amputation scar tissue, Electr. 52
Thirst during twilight sleep, Obst. 20, 31, 34, 36
Thompson, Miss C. M., and Greenwood, M.—Epidemiological study of the food problem, Epid. 61-84
Thompson, T., and Head, H., F.R.S., association of spinal posterior columns with tract of cerebellum, quoted, Neur. 32
Thomson, H. Campbell.—Muscle contracture following injury, R.S.M. Discussion 18
Thomson, Sir StClair.—Congenital deformity showing nose with four nostrils, Laryng. 55
——, discussion on case for diagnosis, Laryng. 85
—— —— —— of epithelioma of ethmoidal labyrinth, Laryng. 33
—— —— —— —— of left vocal cord, Laryng. 9
—— —— —— of laryngo-fissure, Laryng. 114
—— —— —— of orbital tumour, Laryng. 116
—— —— on fusiform dilatation of œsophagus, Laryng. 30
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 32, 43
—— —— on lupoid tuberculosis, Laryng. 6
—— —— —— —— of pharynx, Laryng. 45
—— —— on perichondritis of larynx, Laryng. 133
—— —— on pharyngeal pouch treated by diverticulopexy, Laryng. 61
—— —— on rhinoplasty, Laryng. 108
—— —— on symmetrical ulceration of vocal cords, Laryng. 117
—— —— on warfare injuries and neuroses of larynx, Laryng. 190
——, epithelioma of the larynx, in a lady aged 46, ten months after laryngo-fissure, Laryng. 13
——, extensive tuberculosis of the larynx, completely cicatrized under sanatorium silence and galvano-cautery treatment, Laryng. 16
——, extrinsic cancer of larynx, four years after operation, by Mr. Wilfred Trotter, through the side of the neck, Laryng. 127
——, fusiform dilatation of the œsophagus, coated with *Oïdium albicans*, in a girl, aged 15, and apparently idiopathic, Laryng. 29

THOMSON, Sir STCLAIR.—Intrinsic cancer of larynx, laryngo-fissure and semi-demi-laryngectomy, one year after operation, Laryng. 126
——, male, aged 22, who presented himself with a saddle-back nose, consequent on a resection of the septum, performed in the country, Laryng. 20
——, stenosis of the glottis, from a combination of tubercle and syphilis, in a woman, aged 51, requiring tracheotomy, Laryng. 76
—— —— ——, from combined tubercle and syphilis, requiring tracheotomy, in man, aged 41, Laryng. 77
——, tooth impacted in a secondary bronchus of the left lung, removal by tracheotomy and lower bronchoscopy, after two unsuccessful attempts by upper bronchoscopy, Odont. 100-111
——, tuberculosis of the larynx, in a gentleman, aged 63, under treatment with the galvano-cautery, Laryng. 15
Thorium in treatment of multiple papillomata of larynx, Laryng. 67
Thrombosis of cavernous sinus due to disease of sphenoidal sinus, Otol. 35
—— of lateral sinus, due to acute mastoid suppuration, diagnosis from aural bacteræmia, Otol. 51
—— —— ——, following accidental exposure of sinus, Otol. 50, 52
Thyrofissure and removal of right cord six years after operation, case (G. C. Cathcart), Laryng. 121
—— compared with window resection of thyroid cartilage in removal of epithelioma of larynx, Laryng. 150-153
Thyroglossal cyst, remains of, destroyed by diathermy, Electr. 44
Thyroid cartilage, window resection of, in removal of epithelioma of larynx (H. Lambert Lack), Laryng. 149, 150
—— —— —— —— —— —— ——, compared with thyro-fissure, Laryng. 150-153
Thyroid extract in treatment of fibroma molluscum, Derm. 83
Thyroid gland, enlarged, operations for injury to recurrent laryngeal nerve in, Laryng. 190
—— tumour at base of tongue (H. Lambert Lack), Laryng. 154
—— —— —— ——, operations for, discussed, Laryng. 154, 155
Thyro-lingual cyst? case of (H. J. Banks-Davis), Laryng. 167
Tibia, bone grafts from, how obtained, Odont. 45, 47
——, bony outgrowth from back of, removal, causing pain in amputation stumps below knee, R.S.M. Lect. 17, 18
——, posterior margin of, internal saphenous vein causing pain about level of, in amputation below knee, R.S.M. Lect., 17
Tibial nerve, anterior, retraction of, after Syme's amputation, R.S.M. Lect. 19, 20
—— ——, posterior, strangulation by internal scar cause of painful stump in Syme's amputation, R.S.M. Lect. 19, 20
Tigris front in Mesopotamia, scurvy among Indian troops on, Epid. 27
TILLEY, HERBERT.—Concentric narrowing of each meatus following scarlet fever, at the age of 5, Otol. 65
——, discussion on case for diagnosis, Laryng. 85
—— —— —— of aural fibroma, Otol. 68
—— —— —— of salivary calculus, Laryng. 82
—— —— —— of tumour of nasopharynx, Laryng. 119
—— —— on epithelioma of ethmoidal labyrinth, lateral rhinotomy, Laryng. 32
—— —— on fusiform dilatation of œsophagus, Laryng. 30
—— —— on gastro-intestinal sepsis as cause of Ménière's symptoms, Otol. 20
—— —— on influence of diseases and abnormalities of nose upon ear, Otol. 41
—— —— on intranasal frontal sinus operation under nitrous oxide anæsthesia, Laryng. 137
—— —— on large submaxillary calculus, Laryng. 156
—— —— on multiple papillomata of larynx, tracheotomy and removal under suspension laryngoscopy, Laryng. 67
—— —— —— —— of larynx in child, Laryng. 67

TILLEY, HERBERT.—Discussion on naso-antral polypi, Laryng. 125
——, discussion on nystagmoid movements in pharynx and larynx, Laryng. 143
—— —— on osteoma of left frontal bone, Laryng. 75
—— —— on pedunculated carcinoma of pharynx, Laryng. 124
—— —— on removal of epithelioma of larynx, Laryng. 152
—— —— on repair of nose by paraffin injection, Laryng. 136
—— —— on retention cyst of nasal floor, Laryng. 59
—— —— on rhinoplasty, Laryng. 109
—— —— on symmetrical ulceration of vocal cords, Laryng. 117
—— —— on transplantation of cartilage into septum, Laryng. 140
—— —— on tumour of palate in child, aged 8 months, Laryng. 134
—— —— on warfare injuries and neuroses of larynx, Laryng. 187
——, patient from whom a large malignant growth has been removed from right antrum, Laryng. 136
——, series of consecutive cases in which the mastoid has been operated on for acute suppurative inflammation, B.I.P. (bismuth, iodoform, and liquid paraffin), inserted, and the external wound sutured in its entire length at the close of the operation, Otol. 69-76
——, a surgical *contretemps*, illustrating the value of endoscopy, Laryng. 73
Tin miners, mortality from tuberculosis and lung diseases in, compared with that from other diseases, Epid. 135, 136
—— —— —— from tuberculosis at various age periods, Epid. 136, 137
—— —— of Cornwall, age incidence of maximum frequency of deaths from phthisis in, Epid. 147
—— ——, pulmonary tuberculosis in, incidence, Epid. 145
Tinnitus and vertigo in ear lesions, relief by nasal cauterization, Otol. 31
——, blood-pressure in cases of, Otol. 24
——, conditions under which relieved by operations on nose, Otol. 41
——, gastric lavage in cases of, Otol. 20
—— of otosclerosis, treatment, Otol. 24
——, small hard kidney in patients with, Otol. 19
TOD, HUNTER.—Case of gunshot wound of larynx, Laryng. 176
——, lipoma of larynx removed by operation (specimen exhibited), Laryng. 67
——, multiple papillomata of larynx removed by operation (suspension method), after tracheotomy, death five weeks later from acute membranous tracheitis and bronchitis, Laryng. 68
——, osteoma of left frontal bone, Laryng. 74
Tomes, C., F.R.S., penetration of dentine and cementum by fungus, quoted, Odont. 99
——, view as to nature of tubes in marsupial enamel, quoted, Odont. 50
Tomes's processes, fibrils of, penetrating ameloblastic membrane, Odont. 58, 59
—— ——, incorporation into forming enamel, Odont. 56, 57, 65
—— ——, nature of, Odont. 56, 65
Tone range in tuning-fork tests, Otol. 5
Tongue, base of, thyroid tumour at (H. Lambert Lack), Laryng. 151
—— —— —— ——, operations for, discussed, Laryng. 154, 155
——, cancer of, treatment by diathermy, Electr. 44
—— —— —— ——, results, Electr. 42
Tonsil, actinomycosis of, cases reported, Laryng. 162
——, artery forceps (Dan McKenzie), Laryng. 137
——, calculus of (C. H. Hayton), Laryng. 113
—— —— ——, rarity, Laryng. 113
——, cancer of, treatment by diathermy, Electr. 43
——, crypt of, colony of actinomyces in (W. D. Harmer and A. C. Stevenson), Laryng. 161
—— forceps (W. H. Kelson), Laryng. 37, 38
Tonsils, enucleation, membrane collecting on surface of cavity after, Laryng. 70

Tonsils, faucial pillars, and soft and hard palate, extensive epithelioma affecting, treatment by diathermy, results (N. Patterson), Laryng. 23

——, septic remains of, destruction by diathermy, Electr. 44

Tonsillitis, lacunar, caseous masses of leptothrix in, Laryng. 113

——, non-suppurative, local infection following, Otol. 51

Tooth impacted in secondary bronchus of left lung, development of lung abscess, Odont. 103

—— —— —— —— —— ——, removal by tracheotomy and lower bronchoscopy after two unsuccessful attempts by upper bronchoscopy (Sir StClair Thomson), Odont. 100-111

—— impaction in bronchus, cases reported, Odont. 105

—— —— ——, medico-legal aspect, Odont. 107

—— —— ——, precautionary measures upon occurrence or when suspected, Odont. 106

Topognosis reaction defective in lesions of sensory cortex, Neur. 23

Torus palatinus, Laryng. 134

Toxæmia, alimentary, acrocyanosis associated with, Child. 26

Trachea, fibro-papilloma of, removal by external operation, recovery (Sir William Milligan), Laryng. 52

——, foreign body impacted in (part of shell of Brazil nut) (F. A. Rose), Laryng. 129

——, fracture of four rings of, urgent dyspnœa, operation, recovery (Sir W. Milligan), Laryng. 54

——, gunshot wounds of, perforating, Path. 89

——, shrapnel wound of, case (W. S. Syme), Laryng. 177

——, stenosis, due to bullet wounds, treatment, Laryng. 187

——, wall of, papilloma growing from, Laryng. 53

Tracheitis, acute membranous, and bronchitis, death from, five weeks after operation (suspension method) for removal of multiple papillomata of larynx (H. Tod), Laryng. 68

Tracheotomy and lower bronchoscopy in removal of tooth impacted in secondary bronchus of left lung (Sir StClair Thomson), Odont. 100-111

—— and removal under suspension laryngoscopy of multiple papillomata of larynx in child (J. Dundas Grant), Laryng. 66

——, high and low, relative merits discussed, Laryng, 191, 193, 199

—— —— or low, in gunshot wounds of larynx, Laryng. 181, 187, 188, 190, 191, 193

—— in epithelioma of larynx, question of, Laryng. 152, 153

—— in fixation of both vocal cords (E. D. D. Davis), Laryng. 138

—— in stenosis of larynx following gunshot wounds, Laryng. 190, 191, 199

—— multiple papillomata of larynx removed by operation (suspension method) after, death five weeks later from acute membranous tracheitis and bronchitis (Hunter Tod), Laryng. 68

——, promptness in performance of, Laryng. 78

——, removal of teeth from air-passages under, Odont. 110

—— required for stenosis of glottis, from combination of tubercle and syphilis, cases (Sir StClair Thomson), Laryng. 76, 77

—— tube holder, Laryng. 192

—— —— holders, method of supporting, Laryng. 192

—— —— with lead dilator, insertion in treatment of tracheal stenosis due to bullet wounds, Laryng. 187

Transformer for heating current of Coolidge tube (E. E. Burnside), Electr. 58

Transport workers, open-air, pulmonary tuberculosis in, incidence, Epid. 145

Transversus, paresis of, in functional aphonia of soldiers, Laryng. 165

Tremor of patients under anæsthetics, Anæsth. 11

Tremors, method of overcoming, Neur. 41

Trench disinfection in cholera outbreak in Italian army, Epid. 45

—— fever, ætiology, Epid. 20, 21

—— ——, diagnosis, difficulties in, Epid. 19, 20

—— —— in Eastern Campaigns, Epid. 10

—— —— in France, Epid. 20

Trench fever in Salonica, Epid. 19, 20
—— foot, prophylactic injection of antitetanic serum in, R.S.M. Discussion 21
Trenches, toxic polyneuritis of, Neur. 29
Trethowan, W. H., and Cameron, H. C.—Case for diagnosis, Child. 45
Trichotillomania, with delusions of nasal origin, case (H. J. Banks-Davis), Laryng. 166
Tri-nitro-toluene, crude tetra-nitro-methane in, Epid. 155
——, effects on respiratory organs, Epid. 155
——, exposure to, delayed occurrence of toxic jaundice after, Epid. 163
—— factories, alternation of employment in, effect on health of workers, Epid. 154
—— ——, clean working cardinal rule in, Epid. 153
—— ——, hygienic rules for observance in, Epid. 149
—— ——, toxic jaundice and minor illness in, varying incidence, Epid. 157
—— ——, toxic jaundice in, incidence, curves showing, Epid. 159-162
—— ——, whole-time medical officers for, Epid. 153
—— ——, work of dentists in, Epid. 156
—— poisoning, ætiology obscure, Epid. 164
—— ——, cyanosis following, Epid. 157, 165
—— ——, effects on alimentary canal, Epid. 152, 156, 165, 167
—— —— —— on blood, Epid. 157, 158, 164, 165
—— —— —— on bone marrow, Epid. 153, 165
—— —— —— on liver, Epid. 150, 151, 158, 159, 162-165
—— ——, epidemiology of (W. J. O'Donovan), Epid. 149-168
—— ——, first case, Epid. 151
—— —— —— death due to, Epid. 152
—— ——, minor, diminution, causes of, Epid. 153
—— —— —— —— in shell-filling factory, Epid. 152
—— ——, not notifiable under Factory and Workshop Act, Epid. 165
—— ——, prevalence of, information as to, Epid. 151
——, shell-filling with, by hand, skilled and unskilled workers at, Epid. 153, 154
—— —— ——, improved methods, Epid. 154
—— workers, aplastic anæmia in, Epid. 157
—— ——, gastro-enteritis in, Epid. 167
—— ——, gloves little used by, Epid. 156
—— ——, mistakes in diagnosis in fatal illnesses of, Epid. 157
—— ——, preliminary medical examination, Epid. 153
Trophic functions of sensory cortex of brain, question of, and evidence for, Neur. 25, 26
—— —— of spinal ganglia, how evidenced, Neur. 26
Trotter, Wilfred, operation by, through side of neck, for extrinsic cancer of larynx, case shown four years later (Sir StClair Thomson), Laryng. 127
Trunk and extremities, extensive nævus of, involving palms and soles, case (G. Pernet), Derm. 9
Tube and pin method in fractures of mandible, Odont. 25, 26
Tubercle-bacillus, experimental injection of eyes of rabbits with, causing infection of ciliary body, Ophth. 1
Tuberculin, injection in case of lupoid tuberculosis of pharynx, results, Laryng. 41, 45, 46
Tuberculosis among women, increase in mortality due to industrialization, Epid. 142
—— and congenital syphilis, association, Child. 13
—— and famine, relation between, Epid. 83
—— and syphilis, laryngeal, combination resulting in stenosis of glottis, requiring tracheotomy, cases (Sir StClair Thomson), Laryng. 76, 77
——, death-rate in women, increase since outbreak of the war. Epid. 83
—— in Italian army, Epid. 52
——, industrial, classification of occupations in regard to, Epid. 145
—— ——, incidence of, discussion on (John Brownlee), Epid. 147; (E. L. Collis), Epid. 133, 148; (M. Greenwood), Epid. 142; (B. Moore), Epid. 145

Tuberculosis, industrial, mortality from, difficulty in obtaining accurate records, Epid. 138
—— —— prevalence of influences affecting, Epid. 134
—— —— —— —— —— ——, necessity for study of morbidity records, Epid. 139, 140
——, inhalation of dust of silica affecting prevalence of, Epid. 135
——, laryngeal (case for diagnosis), Laryng. 85
—— ——, case (W. Jobson Horne), Laryng. 86
—— —— —— under treatment with galvano-cautery (Sir StClair Thomson), Laryng. 15
—— ——, complicated by aphonia, Laryng. 192, 200
—— ——, dyspnœa and regurgitation of liquids during drinking relieved by intralaryngeal operation (J. Dundas Grant), Laryng. 63
—— ——, extensive, completely cicatrized under sanatorium silence and galvano-cautery treatment (Sir StClair Thomson), Laryng. 16
—— ——, in early stage complicated by aphonia, Laryng. 182, 192
—— ——, in elderly subjects, features of, Laryng. 85
—— ——, simulated by fibro-papilloma of larynx, case (J. Dundas Grant), Laryng. 64
—— —— treatment by galvano-cautery, indications and contra-indications for, Laryng. 17-19
—— mortality from, incidence at various age-periods, Epid. 136, 137
—— —— among metal grinders on sandstone wheels, difficult to obtain, Epid. 138
—— —— from association with that of other diseases, Epid. 135, 136
—— —— ——, value of "proportionate mortality" for investigating, Epid. 138
—— —— in publicans compared with that from other diseases, Epid. 135, 136
—— —— in shoemakers at various age-periods, Epid. 136, 137
—— —— —— —— compared with that from other diseases, Epid. 135, 136
—— —— in tin miners at various age-periods, Epid, 136, 137
—— —— —— —— compared with that for other diseases, Epid. 135, 136
—— of lupoid type defined, Laryng. 5
—— ——, nature discussed, Laryng. 5, 6
—— —— of nose and larynx, in girl, aged 17 (Irwin Moore), Laryng. 22
—— —— of pharynx, affecting soft palate and uvula in boy, aged 8, subject of congenital syphilis (Irwin Moore), Laryng. 2, 39
—— —— —— —— —— —— —— —— —— —— —— ——, treatment by injection of tuberculin, Laryng. 41, 45, 46
—— —— tertiary syphilis of pharynx clinically resembling (Irwin Moore), Laryng. 4, 47
—— of nasopharyngeal adenoid tissue, percentage in those free from and those suffering with pulmonary tuberculosis, compared. Laryng. 3
——, pharyngeal, relative rarity of, Laryng. 3
——, pulmonary, age-incidence of deaths from, among slate quarriers and sandstone quarriers in North Wales, compared, Epid. 147, 148
—— —— —— —— —— in males in Shetland Islands and London compared, Epid. 147
—— —— among tin miners in Cornwall, age-incidence of maximum frequency of deaths, Epid. 147
—— ——, cases with aphonia, Laryng. 164, 165
—— —— commonest age of deaths from in different localities, Epid. 147
—— ——, disease not due to one organism but a group of organisms, Epid. 147, 148
—— ——, incidence among compositors, Epid. 147
—— —— —— in printing trade, Epid. 146
—— —— —— —— ——, lessening of, Epid. 146
—— —— —— in various occupations compared, Epid. 145
—— —— —— of, occupations arranged in descending order of, in reports of Registrar-General, Epid. 145, 148
—— ——, left recurrent laryngeal nerve paralysis in patient suffering from (Irwin Moore), Laryng. 167
—— ——, mortality-rates ages 35-45 (1900-1902) for bookbinders, printers, shoemakers, tailors, cabinet makers, Epid. 144, 145
—— —— —— —— —— —— for brewers, slaters and tilers, Epid. 145

Tuberculosis, pulmonary, mortality-rates, predicted values and actual results compared, Epid. 144. 145
—— ——, occupations showing enhanced incidence, Epid. 146
—— ——, percentage of tuberculosis of naso-pharyngeal adenoid tissue in those suffering from and those free from, compared, Laryng. 3, 4
——, subjects of, exhibiting slight pigmenting power, Electr. 10
—— ——, increase of pigmentation in, a prognostic sign, Electr. 11
——, surgical, heliotherapy in, benefits resulting from, Electr. 11
—— —— ——, contra-indications, Electr. 11
—— ——, treatment by X-rays, Electr. 11, 12
—— —— —— ——, contra-indications, Electr. 12
Tuberculous infiltration of larynx, Laryng. 6
Tudor period, later, surgery during, Hist. 55
TUKE, C. M.—Discussion on repression of war experience, Psych. 20
Tumour cells of malignant endothelioma, Path. 22, 23
—— —— —— ——, forming endothelium of blood space, Path. 22
—— —— —— ——, vacuolation of, Path. 23, 24
Tumours arising from endothelium (E. H. Kettle), Path. 19
——, innocent, forming metastases, Path. 29
Tungsten arc in treatment of war wounds, Electr. 55
—— tubes, water cooled, attached to mobile X-ray wagon unit, Electr. 57
Tuning-fork tests for hearing, Otol. 5
Tunnelled wounds of liver, Path. 63-68
Turbinals, advancement of, case of total loss of nose illustrating method (G. S. Hett), Laryng. 94
—— ——, in gunshot wounds of nose, cases (G. S. Hett), Laryng. 99-108
—— ——, in rhinoplasty, Laryng. 89
—— ——, not followed by atrophic rhinitis, Laryng. 108, 109
——, inferior, enlarged, causing nasal obstruction, removal, Otol. 37
—— ——, removal, recovery from double otorrhœa after, Otol. 34
TURRELL, W. J.—Discussion on treatment of injury to peripheral nerves, Electr. 31
"Twilight sleep," definition of, Obst. 3
—— ——, first introduction of term, Obst. 3 ; see also *Scopolamine-morphine* narcosis
Tympanic membrane, ruptured, deafness following, prognosis, Otol. 9
Tympanum and frontal sinus, paths of infection between, Otol. 31
——, suppuration, rarely following nasal suppurative sinusitis, Otol. 30
Type, luminous, for estimating light sense in night blindness (F. Moxon), Ophth. 11
—— —— —— —— —— —— ——, materials from which made, Ophth. 12
Typhoid fever and paratyphoid fever, vaccination against, in Italian army, Epid. 48
—— ——, deaths from, during siege of Paris, Epid. 75
—— ——, prevalence in Eastern campaigns among New Zealand forces, Epid. 11
—— —— —— —— ——, cause of low percentage, Epid. 10
Typhus fever accompanying famines, Epid. 74
—— ——, epidemic in Austro-Hungarian Army, Epid. 32, 33
—— —— —— in Roumania (1916), Epid. 39
—— ——, individual prophylaxis against, Epid. 36
—— —— —— —— ——, clothing suitable for, Epid. 36
—— ——, infection with, difficulty of escaping, Epid. 36
—— ——, pandemic, in Serbia, 1914-15 (V. Soubbotitch), Epid. 31
—— —— —— —— ——, accompanied by relapsing fever, Epid. 33
—— —— —— —— ——, difficulty of isolation of patients, Epid. 38
—— —— —— —— ——, source of, Epid. 31, 32
—— —— —— —— ——, spread of, causes, Epid. 33
—— —— —— —— —— ——, by lice, disinfection measures against, Epid. 33-37, 38
—— —— —— —— ——, surgical complications, Epid. 37

Typhus fever, records of famines without, Epid. 74
Tyrrell, F. A. C. Case of Mooren's ulcer, Ophth. 7

Ulcus molle serpiginosum, case (E. G. Graham Little), Derm. 21
—— —— ——, starting from bubo, Derm. 22, 23
Ulnar nerve, injury to, prognosis after operation, Electr. 35
Ultra-violet light and ionization in treatment of scar-tissue of amputation stumps, Electr. 54
—— radiation, deposit of pigment in skin by, Electr. 9, 10
—— ——, slight penetrative power of, Electr. 9
——, rays of, shorter wave length than found in solar spectrum, not of value, Electr. 10
Umbilicus, primary syphilitic chancre of, case (George Pernet), Derm. 23
—— —— —— ——, rarity, Derm. 24
Underwood, A., calcification of enamel, quoted, Odont. 60
Urinary tract, unstriped muscle of, effect of scopolamine on, Obst. 2, 3
Urine, *Microfilaria nocturna* in, enumeration method, M.B.L. 5
Urotropine, administration in aural septicæmia, caution necessary, Otol. 50, 51
Urticaria pigmentosa, types of, Derm. 61
Uterus, cancer of body of, and fibroids, treatment by amputation at cervix, Obst. 55
—— —— ——, complicating myoma, treatment by amputation at cervix, recurrence after, Obst. 55, 56
—— —— ——, undiagnosed, complicating myoma, treated by total abdominal hysterectomy (H. R. Spencer), Obst. 48
—— —— —— —— —— ——, treatment by total abdominal hysterectomy, cases, Obst. 48-53
—— ——, diagnosis at early stage, importance of, Obst. 58
——, cervix, amputation at, in treatment of fibroids and cancer of body of uterus, Obst. 55
—— —— ——, in treatment of myoma complicated by cancer of body of uterus, Obst. 54
—— ——, cancer, treatment by diathermy, Electr. 45, 48
—— ——, circumcision and clamping of mucosa before amputation for myoma. Obst. 56
——, contractions of, effect of scopolamine-morphine narcosis on, Obst. 9, 20
——, fibromyoma of, treatment by total abdominal hysterectomy, Obst. 57
——, inertia, avoidance of scopolamine-morphine narcosis in, Obst. 9, 31, 44
——, inversion of, acute, operation by abdominal route, recovery, Obst. 46
—— ——, complicated by intestinal obstruction (O. Tilson Dinnick), Obst. 45
—— ——, prognosis, Obst. 47
—— ——, treatment, operative at early stage, important, Obst. 47
Uveitis, plastic, accompanying changes in vitreous due to septic wounds, Ophth. 2
Uvula affected by lupoid tuberculosis of pharynx, in subject of congenital syphilis (Irwin Moore), Laryng. 39
—— —— —— —— —— —— —— ——, histological examination Laryng. 41-44, 46
—— and soft palate affected by lupoid tuberculosis of uvula, in subject of congenital syphilis (Irwin Moore), Laryng. 2
—— —— ——, epithelioma of (A. Wylie), Laryng. 110

Vaccine treatment of aural septicæmia, caution necessary, Otol. 50, 51
Vacuolation of tumour cells, Path. 23, 24
Vagina, fibro-endothelioma of, removal of, thirteen and a half years after removal of endotheliomatous dermoid of ovary (H. R. Spencer), Obst. 59
Vapour-pressures of chloroform, Anæsth. 17
Vasomotor affections in lesions of sensory cortex, Neur. 23
Vegetable-cells, living, action of chloroform on, Anæsth. 15
Vegetables containing anti-scurvy vitamines, Epid. 78
——, electro-motive force in, Electr. 26, 27
——, fresh, calorie value, in dietary at Millbank Penitentiary, Epid. 78-80

Vegetables, galvanometer experiments with, Electr. 26
Veins, gunshot wounds of, Path. 114-117
—— —— ——, perforating, absence of disruptive effect, factors accounting for, Path. 116, 117
Vena cava, gunshot wounds of, double perforating, Path. 114
—— ——, perforation, with tunnelled wound of liver caused by shell-fragment, Path. 68
Venous congestion following administration of warm ether in orthopædic cases, Anæsth. 8
Ventilation in T.N.T. factories, importance of, Epid. 155
Vertebra, spinal, missile lodged in body of, causing injury to one or more anterior roots, case, Laryng. 28
Vertigo (aural) and tinnitus in ear lesions, relief by nasal cauterization, Otol. 31
—— ——, factors in causation of, Otol. 23
—— ——, methods of relieving, Otol. 23
—— —— —— ——, according to factors producing, Otol. 23
—— ——, treatment, aperient, Otol. 21
—— ——, with unilateral obstruction of Eustachian tube and without deafness, Otol. 21, 22
—— —— —— —— —— —— —— —— ——, in airmen, Otol. 21, 22
—— —— —— —— —— —— —— —— —— ——, result of hearing tests, Otol. 22
——, epileptiform, cases of, Otol. 19
Vicary, T., relations of John Halle with, Hist. 56
Victorius, treatment of syphilis, quoted, Hist. 57
Vienna, reformer of medical education at, Hist. 15
Villages, course of epidemic plague in, Epid. 128, 129
Vinrace, Dennis.—Discussion on case for diagnosis, Derm. 59
Viscera, bullet wounds of, shape of resulting fissures, Path. 51
——, solid, gunshot injuries of, Path. 51
Vision, hysterical disorders of (L. R. Yealland), Ophth. 13
Vitamines, anti-scurvy, vegetables containing, Epid. 78
Vitiligo and congenital syphilis, Child. 18
—— patches, with central pigmented mole (J. L. Bunch), Child. 17
Vitreous chamber, pouring of exudate into, cause of, Ophth. 2
——, changes in, resulting from penetrating septic wounds (R. H. Elliot), Ophth. 1
—— —— —— —— —— ——, based on 780 cases of couching and anatomical examination of fifty-four globes, Ophth. 1
——, infection of, earliest stages in, Ophth. 4
——, opacities in, due to mild infections, composition of, Ophth. 3
——, septic infection of, effect on fixed cells, Ophth. 3
—— —— ——, extension of inflammation to choroid in, Ophth. 4
Vocal cord, left, complete paresis of, due to mediastinal growth (Irwin Moore), Laryng. 49
—— —— ——, epithelioma, in syphilitic subject, Laryng. 7, 9
—— —— —— —— ——, specimen of, two years after operation (James Donelan), Laryng. 7
—— —— ——, paralysis of, case (W. H. Kelson), Laryng. 38, 79
—— —— paralysis, unilateral, cause, Laryng. 186
—— ——, right, removal of, by thyrofissure six years after operation, case (G. C. Cathcart), Laryng. 121
—— cords, changes in, following gassing, Laryng. 188
—— ——, condition in functional aphonia, Laryng. 188
—— ——, fixation of, tracheotomy for (E. D. D. Davis), Laryng. 138
—— ——, foreign body (collar stud) impacted between, causing death, Laryng. 72
—— ——, movements of, simple method of recording diagrammatically, with special reference to tremors (A. Brown Kelly), Laryng. 143
—— ——, nodules, symmetrical, in children, Laryng. 117, 118
—— —— —— ——, laryngitis in, Laryng. 118
—— —— —— ——, three cases (E. D. D. Davis), Laryng. 116
—— —— —— ——, treatment, Laryng. 117, 118
—— ——, paralysis, following gunshot wounds of neck, Laryng. 181

Vocal cords, position, cadaveric, Laryng. 144, 148, 183

—— —— ——, variations in on attempted phonation, in functional aphonia, Laryng. 182

—— ——, state of, during deep and quiet respiration, Laryng. 144-146

—— ——, tremors chiefly noticed during expiration, Laryng. 149

—— —— ——, in diseases of central nervous system, Laryng. 147

—— —— ——, physiological, Laryng. 147

—— ——, ulceration, symmetrical, case (E. D. D. Davis), Laryng. 117

Voice production in connexion with rhinoplasty, Laryng. 109

—— —— in subjects of functional aphonia, Laryng. 182-185, 186, 187, 192, 198, 200

——, rest of, after gunshot injuries of larynx, Laryng. 190

——, singers' nodules developing without excessive use of, Laryng. 117

Volition, neurotic symptoms proceeding from, Psych. 29, 30

Volkmann's ischæmic contracture, R.S.M. Discussion 7

Vomiting, disadvantage of sitting up chloroform method, Anæsth. 12

—— rare under intratracheal administration of ether, Anæsth. 12

Vulcanite plates, graduated series, in fractured maxilla, Odont. 21

WAGGETT, E. B.—Myiasis of the ear—larva of the flesh fly, Otol. 14

Wales, North, age-incidence of deaths from phthisis in slate quarriers and sandstone quarriers compared, Epid. 147, 148

Wallace, Surgeon-General C. S., percentage of successful cases of compound fracture treated by primary suture, quoted, R.S.M. Lect. 2, 3

Waller, A. D., F.R.S., difficulty of recovery of chloroform from blood, quoted, Anæsth. 17

War adaptation, failure in, leading to neuroses, Psych. 28

——, alteration of innate human ideals by, Pysch. 25

—— an official abrogation of civilized standards, Psych. 25

—— conditions, repression of fear under, Psych. 29

—— experiences, painful, attacks of intense depression produced by, Psych. 9, 10

—— —— ——, brooding upon, and unrestrained discussion of, Psych. 17

—— —— ——, exaggeration of, Psych. 13, 14

—— —— ——, memories of, method of mitigating, Psych. 5, 6

—— —— ——, repression, Psych. 3, 9, 16, 17 ; (W. H. R. Rivers), Psych. 1

—— —— —— ——, ill-effects of, Psych. 4, 8, 12, 13, 16, 18

—— ——, revolting, followed by horrible dreams, Psych. 7

——, greater incidence of muscle contracture following injury in, explained, R.S.M. Discussion 12, 20

——, moral reprobation attaching to desire to escape from shell-fire in, Psych. 29

—— museum attached to Italian army, Epid. 53

—— neuroses and peace neuroses, symptoms of each identical, Psych. 23, 24

—— ——, cause of, Psych. 18

—— ——, cinematograph demonstrations of (A. F. Hurst), Neur. 39

—— ——, class suitable for treatment by psycho-analysis, Psych. 36

—— —— in soldiers, treatment, objects of, Psych. 16

—— ——, investigations by psycho-analysis, Psych. 23

—— ——, morbid anxiety in relation to, Psych. 34

—— ——, prominent factor in production of, Psych. 2

—— ——, sufferers from, attitude towards death, Psych. 36

—— —— —— ——, beneficial action of form of catharsis in, Psych. 13, 14

—— ——, transition into peace-neuroses, Psych. 36

—— ——, treatment, improved methods in, Neur. 39-42

—— —— ——, inadequate, ill-results from, Neur. 41

War Office Committee for the Study of Tetanus, circular issued by, R.S.M. Discussion 1, 2

—— —— —— —— —— dosage in prophylactic injection of antitetanic serum prescribed by, R.S.M. Discussion 22

War Office Committee for the Study of Tetanus, needles for lumbar puncture in injection of antitetanic serum prescribed by, R.S.M. Discussion 24
—— shock, in relation to Freud's theory of the neuroses (Ernest Jones), Psych. 21
—— —— —— —— —— ——, how exemplified, Psych. 29, 30
—— ——, replacement of term "shell-shock" by that of, Psych. 24
——, sights and deeds of, stimulating impulses to cruelty, Psych. 27
—— (the), cause of production of neuroses in soldiers during, Psych. 2
—— wounds, local, non-suppurative, infection following, Otol. 51
Warren, J. Collins (primus), account of first operation under ether anæsthesia by, Hist. 66, 68
Wassermann test, must be repeated to exclude diagnosis of syphilis, Child. 12, 13
Water, absorption of chloroform by, Anæsth. 17
——, chlorination of, as prophylactic measure against cholera in Mesopotamia, Epid. 14
Watson, value of morbidity records, quoted, Epid. 140
Watson-Williams, P.—Case of sub-acute mastoiditis, paralysis of corresponding sixth nerve, recovering, latent maxillary aural infection, illustrating the advantageous exploration of sinuses by the suction syringe, Otol. 62
——, discussion on aural bacteræmia, Otol. 50
—— —— on concentric narrowing of meatus, Otol. 66
—— —— on influence of diseases and abnormalities of nose on ear, Otol. 34
—— —— on latent mastoid abscess, Otol. 58
—— —— on lupoid tuberculosis of pharynx, Laryng. 38
——, illustrations of nasal endo-rhinoscopy (epidiascope), Laryng. 50
Waxweiler and Slosse, data as to nutrition of Belgian hand-workers, quoted, Epid. 67
Weather and plague, relation between, Epid. 105, 128, 129
Weavers, light metal workers, and quarriers, average energy intakes compared, Epid. 67
Weber, F. Parkes.—Congenital heart disease in a mentally defective child with a negro-mongoloid facies, Child. 3
——, discussion on case of anæmia with unusual blood count, Child. 56
—— —— —— of acute generalized lichen planus, treated by lumbar puncture, Derm. 81
—— —— —— of adenoma sebaceum, Pringle type, Derm. 26
—— —— —— of amaurosis following violent convulsions, Child. 2
—— —— —— of erythromelalgia, Child. 26
—— —— —— of guttate morphœa, Derm. 95
—— —— —— of Hodgkin's disease with prurigo, Derm. 92
—— —— —— of myotonia, Child. 59
—— —— —— of osteomalacia and infantilism, Child. 24
—— —— —— of punctate keratosis of palms of hand and soles of feet, Derm. 90
—— —— —— of sclerodactyly, Derm. 20
—— —— —— of vitiligo patches with central pigmented mole, Child. 17, 18
—— —— on cases for diagnosis, Derm. 48, 49, 72, 84
—— —— on syphilitic rash appearing after twenty-three injections of novarsenobillon, Derm. 80
—— —— on three cases of fibroma molluscum, Derm. 83
—— —— on tumours arising from endothelium, Path. 34
—— and Dove, P. W.—Case of pruritus in Hodgkin's disease (lymphogranulomatosis pruriginosa), Derm. 68
Weight estimation, impairment, in lesions of sensory cortex, Neur. 23, 24
Wells, J. H., observations on blood of patients dying under influence of chloroform, quoted, Anæsth. 27
West, C. E.—Discussion on aural bacteræmia, Otol. 51
Whale, H. Lawson.—Discussion on aural bacteræmia, Otol. 50
——, discussion on case of aural fibroma, Otol. 68
—— —— on depressed scar following mastoid operation, Otol. 56
—— —— on large submaxillary calculus, Laryng. 157
—— —— on operation on mastoid for acute suppurative inflammation, followed by insertion of B.I.P., Otol. 72

WHALE, H. LAWSON.—Discussion on paralysis of arytænoideus, Laryng. 164
——, discussion on recurrent herpes of auricle, Otol. 54
—— —— on thyroid tumour at base of tongue, Laryng. 155
—— —— on warfare injuries and neuroses of larynx, Laryng. 193
White, Major, and Gloster, Major, spread of plague in United Provinces of India, quoted, Epid. 113
White spot disease, term incorrectly applied to diseases other than morphœa guttata, Derm. 27
—— —— ——, see also *Morphœa guttata*
WHITFIELD, A.—Discussion on case of acne keloid, Derm. 52
WHITING, A. J.—On the comparative value of the digitalis series of remedies in the heart failure of auricular fibrillation, and the changes in the clinical features of mitral stenosis after fibrillation of the auricle, Therap. 1-52
Whirlpool bath, preliminary treatment of paralysed muscles by, Electr. 34
Whooping-cough in young soldiers, prophylaxis against, Epid. 54
Whytt, Robert, pupil of Boerhaave, Hist. 15
WILLIAMS, E. C.—Discussion on case for diagnosis, Child. 12
Williams, Leon, calcification of enamel, quoted, Odont. 60
——, first description of ameloblastic membranes by, Odont. 58
——, independent formation of interprismatic substance of enamel, quoted, Odont. 62
WILLIAMSON, HERBERT.—Discussion on scopolamine-morphine narcosis in childbirth, Obst. 44
Wilson, S. A. K., disturbance of function of speech in relation to mental disorder, quoted, Neur. 19
——, on apraxia, quoted, Neur. 14
Wind, exposure to, effect on food requirements of sedentary worker, Epid. 71
Winterstein, adsorption between narcotic substance and cell-proteins, quoted, Anæsth. 15
Wire sutures through bone combined with splints in immobilization of fractures of lower jaw, Odont. 84
Wiring, in fractures of mandible, with slight loss of tissue, Odont. 38, 39
Wish fulfilment, Freud's theory in relation to, Psych. 30
—— producing neurosis in conflict with ego ideal, Psych. 31
Wishes, repressed, in relation to production of neuroses, Psych. 31
WOAKES, CLAUD.—Discussion on influence of diseases and abnormalities of nose on ear, Otol. 36
Woakes, E., effect of chronic rhinitis on palate, quoted, Otol. 26, 31
——, necrosing ethmoiditis, quoted, Otol. 26
——, reflex influence of nasal lesions on ear, quoted, Otol. 26, 31
Women, death-rate from tuberculosis in, increase since outbreak of the war, Epid. 83
—— in Leipzig district, death-rates, occupational (1887-1901), Epid. 142
——, increase of tuberculosis among, due to industrialization, Epid. 142
WOODMAN, E. MUSGRAVE.—Discussion on aural bacteræmia, Otol. 52
Work, moderate, amount of calories required for, Epid. 69, 70
——, performance of, and energy used, relation between, Epid. 66
—— ——, efficiency, Epid. 65
——, various grades of, energy requirements, Epid. 70
Workshops, training in, important for soldiers recovering from functional nervous disorders, Neur. 47, 48
WORSTER-DROUGHT, C. C.—Muscle contracture following injury, R.S.M. Discussion 5
Wounds of war, anaërobic infection cause of wide incidence of local tetanus, R.S.M. Discussion 11
—— —— —— ——, muscle contracture following, R.S.M. Discussion, 10, 11
—— —— at the Front, closure of, when contra-indicated, R.S.M. Lect. 2
—— —— ——, suture of, primary (Sir Anthony Bowlby), R.S.M. Lect. 1-4
—— —— —— —— ——, at "Observation Hospital," nature of injuries received, R.S.M. Lect. 3

Wounds of war, at the Front, suture of, at "Observation Hospital," results, R.S.M. Lect. 2, 3
—— —— —— —— —— primary, percentage of successful cases, R.S.M. Lect. 2, 3
—— —— —— —— ——, retention of patients in hospital after, R.S.M. Lect. 1
—— —— avoidance of silk ligatures in, Electr. 50
—— ——, scar tissue of, irritant nature (E. M. Corner), Electr. 49-53
—— ——, suppurating, treatment by electricity and radium at bedside, Electr. 54
—— ——, treatment, electrical, Electr. 54, 55
——, septic, penetrating, changes in vitreous resulting from (R. H. Elliot), Ophth. 1
WYLIE, ANDREW.—Discussion on aural bacteræmia, Otol. 52
——. discussion on case of cholesteatoma exposing lateral sinus, Otol. 11
—— —— —— of fibro-papilloma of larynx removed by means of snare and forceps, Laryng. 65
—— —— on repair of nose by paraffin injection, Laryng. 136
——, epithelioma of soft palate and uvula, Laryng. 110
——, laryngeal case for diagnosis, Laryng. 121
——, papilloma of the larynx, Laryng. 139

Xenophylla cheopis, habits of, Epid. 129
—— ——, spread of plague in India by, Epid. 129
Xerodermia in case of congenital heart disease in mentally defective child, Child. 4
X-ray burns, multiple rodent ulcers with (E. G. Graham Little), Derm. 43
—— diagnosis of fractures of mandible, Odont. 27, 28
—— wagon unit, mobile (H. C. Head), Electr. 56
—— —— —— ——. electrical equipment, Electr. 56
—— —— —— ——, special additions to, Electr. 57
—— —— —— ——, X-ray outfit, Electr. 57
X-rays in removal of fibrous tissue surrounding nerves, Electr. 35
—— in treatment of morphæa guttata, Derm. 28
—— —— of nævus (E. P. Cumberbatch), Electr. 13
—— —— of ringworm of scalp followed by lupus erythematosus, case (E. G. Graham Little), Derm. 4
—— —— —— —— —— —— —— ——, report of application, Derm. 5
—— —— of scar tissue of war wounds and amputation stumps, Electr. 55
—— —— of surgical tuberculosis, Electr. 11, 12
—— —— —— —— (H. J. Gauvain), Electr. 9, 11
—— —— —— —— contra-indications, Electr. 12

Yates, John, Hist. 56
Yaws, diagnosis of accladiosis from, Derm. 16
YEALLAND, L. R.—Hysterical disorders of vision, Ophth. 13
Yorke and Blacklock, method for enumeration of *Microfilaria nocturna* in blood and urine, quoted, M.B.L. 5

Zygoma, neck of mandible ankylosed to, Odont. 88

JOHN BALE, SONS & DANIELSSON, Ltd., 83-91, Great Titchfield Street, London, W.1

BINDING SECT. AUG 2 1967

R
35
R7
v.11
pt.3

Royal Society of Medicine,
London
Proceedings

Biological
& Medical
Serials

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY